



grzimek's
Student Animal Life Resource
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Reptiles



grzimek's

Student Animal Life Resource



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Reptiles
volume 1

Turtles to Wormlizards

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Reader's Guide

Grzimek's Student Animal Life Resource: Reptiles offers readers comprehensive and easy-to-use information on Earth's reptiles. Order entries provide an overview of a group of families, and family entries provide an overview of a particular family. Entries are arranged by taxonomy, the science through which living things are classified into related groups. Each entry includes sections on physical characteristics; geographic range; habitat; diet; behavior and reproduction; animals and people; and conservation status. All entries are followed by one or more species accounts with the same information as well as a range map and photo or illustration for each species. Entries conclude with a list of books, periodicals, and Web sites that may be used for further research.

ADDITIONAL FEATURES

Each volume of *Grzimek's Student Animal Life Resource: Reptiles* includes a pronunciation guide for scientific names, a glossary, an overview of Reptiles, a list of species in the set by biome, a list of species by geographic range, and an index. The set has 180 full-color maps, photos, and illustrations to enliven the text, and sidebars provide additional facts and related information.

NOTE

Grzimek's Student Animal Life Resource: Reptiles has standardized information in the Conservation Status section. The IUCN Red List provides the world's most comprehensive inventory of

the global conservation status of plants and animals. Using a set of criteria to evaluate extinction risk, the IUCN recognizes the following categories: Extinct, Extinct in the Wild, Critically Endangered, Endangered, Vulnerable, Conservation Dependent, Near Threatened, Least Concern, and Data Deficient. These terms are defined where they are used in the text, but for a complete explanation of each category, visit the IUCN web page at <http://www.iucn.org/themes/ssc/redlists/RLcats2001booklet.html>.

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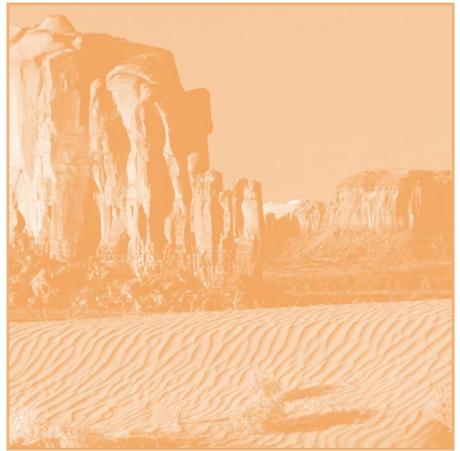
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COMMENTS AND SUGGESTIONS

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Pronunciation Guide for Scientific Names



Acanthophis antarcticus uh-KAN-thuh-fuhs ant-ARK-tih-kuhs

Acrochordidae AK-ruh-KOR-duh-dee

Acrochordus granulatus AK-ruh-KOR-duhs GRAN-yoo-LAH-tuhs

Agama hispida uh-GAM-uh HIIH-spih-duh

Agamidae uh-GAM-uh-dee

Agamodon anguliceps uh-GAM-uh-don AN-guh-LIH-seps

Agkistrodon piscivorus ag-KIS-truh-DON PIH-sih-VER-uhs

Alligator mississippiensis AL-uh-GAY-der MIS-uh-SIP-ee-EN-suhs

Alligatoridae AL-uh-guh-TOR-uh-dee

Amphisbaena alba AM-fus-BEE-nuh AL-buh

Amphisbaenidae AM-fus-BEE-nuh-dee

Anguidae ANG-gwuh-dee

Aniliidae AN-uh-LY-uh-dee

Anilius scytale AN-uh-LY-uhs SY-tuh-lee

Anolis carolinensis uh-NOH-luhs kar-uh-LINE-en-sis

Anomalepididae uh-NOM-uh-luh-PID-uh-dee

Anomochilidae AN-uh-moh-KIL-uh-dee

Anomochilus leonardi AN-uh-moh-KIL-uhs LEE-oh-nar-DY

Apalone spinifera uh-PAL-uh-nee SPIH-nih-FER-uh

Aspidites melanocephalus a-SPID-uh-teez MEL-uh-noh-SEF-uh-luhs

Atractaspididae at-TRAK-tuh-SPID-uh-dee

Atractaspis bibronii at-TRAK-tuh-spuhs bib-ROH-nee-EYE

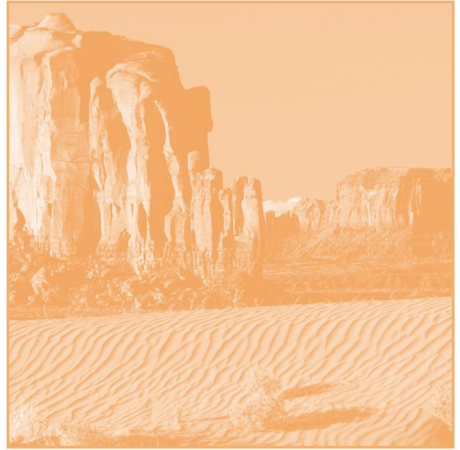
Bachia bresslaui buh-KEE-uh BREZ-lou-eye

Bipedidae by-PED-uh-dee
Bipes biporus BY-peeZ by-POR-uhs
Boa constrictor constrictor BOH-uh kun-STRIK-ter kun-STRIK-ter
 Boidae BOH-uh-dee
 Bolyeriidae boh-LY-uh-REE-uh-dee
Brookesia perarmata broo-KEEZ-ee-uh per-ARM-uh-tuh
Caiman crocodilus KAY-mun KRAH-kuh-DIL-uhs
Cape ctenosaura hemilopha KAYP STEN-uh-SOR-uh heh-MIL-uh-fuh
Caretta caretta kuh-RED-uh kuh-RED-uh
 Carettochelyidae kuh-RED-oh-kuh-LY-uh-dee
Carettochelys insculpta kuh-RED-oh-KUH-leeZ in-SKULP-tuh
Casarea dussumieri KAY-suh-REE-uh duh-SOO-mee-AIR-eye
Cerastes cerastes suh-ROS-teeZ suh-ROS-teeZ
Chamaeleo chamaeleon kuh-MEE-lee-OH kuh-MEE-lee-ON
Chamaeleo jacksonii kuh-MEE-lee-OH JAK-suh-NEE-eye
 Chamaeleonidae kuh-MEE-lee-ON-uh-dee
 Chelidae KEL-uh-dee
Chelonia mydas kuh-LON-ee-uh MY-duhs
 Cheloniidae KEL-uh-NY-uh-dee
Chelus fimbriatus KEL-uhs fim-bree-AH-tuhs
Chelydra serpentina kuh-LIH-druh ser-pen-TEE-nuh
 Chelydridae kuh-LIH-druh-dee
Chlamydosaurus kingii kluh-MID-uh-SOR-uhs KIN-jee-eye
Chrysemys picta KRY-suh-meeZ PIK-tuh
Cistoclemmys flavomarginata sis-TOK-luh-meeZ FLAV-uh-MAR-gih-NAH-tuh
Cnemidophorus sexlineatus snuh-MID-uh-FOR-uhs SEKS-lih-NEE-ah-tuhs
Coleonyx variegates KOH-lee-ON-iks VAIR-ee-uh-GAH-teeZ
 Colubridae kuh-LOO-bruh-dee
Corallus caninus koh-RAL-is kay-NINE-uhs
 Cordylidae kor-DIL-uh-dee
Curucia zebrata kuh-ROO-shee-uh zee-BRAH-tuh
 Crocodilians KRAH-kuh-DIL-ee-unz
Crocodilurus lacertinus KRAH-kuh-DIL-oor-uhs luh-SER-duh-nuhs
 Crocodylidae KRAH-kuh-DIL-uh-dee
Crocodylus acutus KRAH-kuh-DIL-uhs uh-KYOO-tuhs

Crocodylus niloticus KRAH-kuh-DIL-uhs NY-lah-TIH-kuhs
Crotalus horridus KROH-tuh-luhs hoh-RID-uhs
Cylindrophidae suh-LIN-druh-FEE-uh-dee
Cylindrophis rufus suh-LIN-druh-FIS ROO-fuhs
Dermatemydidae DER-muh-tuh-MID-uh-DEE
Dermatemys mawii der-muh-TEH-mis muh-WEE-eye
Dermochelyidae DER-muh-kuh-LY-uh-dee
Dermochelys coriacea DER-muh-KEL-eez KOH-ree-ah-SEE-uh
Dibamidae dy-BAH-muh-dee
Dibamus bourreti dy-BAH-muhs BOOR-uh-ty
Dispholidus typus DIS-fuh-LEE-duhs TY-puhs
Draco volans DRAY-koh VOH-lunz
Drymarchon corais DRIH-mar-kun KOR-ray
Elapidae uh-LOP-uh-dee
Emydidae uh-MID-uh-dee
Eumeces laticeps YOO-muh-seez LAD-ih-seps
Eunectes murinus yoo-NEK-teez myoo-REE-nuhs
Gavialidae GAY-vee-AL-uh-dee
Gavialis gangeticus GAY-vee-AL-is gan-JET-uh-kuhs
Gekkonidae geh-KON-uh-dee
Geochelone nigra JEE-oh-KEL-uh-nee NIG-ruh
Geoemydidae JEE-oh-uh-MID-uh-dee
Gerrhonotus liocephalus JER-uh-NOH-duhs LEE-oh-SEF-uh-luhs
Gopherus agassizii go-FER-uhs AG-uh-SEE-zee-eye
Gymnophthalmidae JIM-noh-THAL-muh-dee
Heloderma suspectum HEE-loh-DER-muh suh-SPEK-tum
Helodermatidae HEE-loh-der-MAD-uh-dee
Hemidactylus frenatus HEM-uh-DAK-tih-luhs FREH-nah-tuhs
Heterodon platyrhinos HED-uh-ROH-don PLAD-ih-RY-nohs
Iguanidae ih-GWON-uh-dee
Kinosternidae KIH-nuh-STER-nuh-dee
Lacerta agilis luh-SER-duh uh-JIL-uhs
Lacertidae luh-SER-duh-dee
Lachesis melanocephala luh-KEE-suhs MEL-uh-noh-SEF-uh-luh
Lampropeltis triangulum LAMP-roh-PEL-tuhs TRY-ang-YOO-lum
Laticauda colubrina luh-TIK-oh-duh kuh-LOO-bree-nuh
Leptotyphlopidae LEP-toh-ty-FLOP-uh-dee

Leptotyphlops dulcis LEP-toh-TY-flops DUL-sis
Liotyphlops ternetzii LEE-uh-TY-flops ter-NET-zee-EYE
 Loxocemidae LOK-suh-SEM-uh-dee
Loxocemus bicolor LOK-suh-SEM-uhs BY-kuh-ler
Micrurus fulvius my-KRER-uhs ful-VEE-uhs
Morelia viridis moh-REEL-ee-uh vih-RID-is
Naja nigricollis NAH-juh NIH-grih-KOHL-luhs
Ophiophagus hannah ah-FEE-ah-fuh-guhs HAN-nuh
Pelomedusa subrufa puh-LOM-uh-DOO-suh SUB-ruh-fuh
 Pelomedusidae puh-LOM-uh-DOO-suh-dee
Platysaurus capensis PLAT-ih-SOR-uhs KAY-pen-sis
 Platysternidae PLAT-ih-STER-nuh-dee
Platysternon megacephalum PLAT-ih-STER-nun MEG-uh-SEF-uh-lum
Plectrurus perrotetii plek-TRER-uhs PAIR-uh-TET-ee-eye
 Podocnemididae poh-DOK-nuh-MID-uh-dee
Podocnemis expansa poh-DOK-nuh-MIS ek-SPAN-suh
Python reticulatus PY-thon ruh-TIK-yoo-LAH-tuhs
 Pythonidae PY-thon-uh-dee
Ramphotyphlops nigrescens RAM-fuh-TY-flops nih-GRES-unz
Rhineura floridana ry-NYOOR-uh floh-RID-uh-nuh
 Rhineuridae ry-NYOOR-uh-dee
Sauromalus obesus soh-ROM-uh-luhs oh-BEE-suhs
 Scincidae SKIN-kuh-DEE
Scincus scincus SKIN-kuhs SKIN-kuhs
Sphenodon punctatus SFEN-uh-don PUNK-tah-tuhs
 Sphenodontidae SFEN-uh-DON-tuh-dee
 Squamata skwuh-MOD-uh
Sternotherus odoratus STER-nah-THUH-ruhs OH-duh-RAH-tuhs
 Teiidae TEE-uh-dee
Terrapene carolina ter-ROP-uh-nee KAR-uh-LINE-uh
 Testudines tes-TYOO-duh-nee
 Testudinidae TES-tyoo-DIN-uh-dee
Thamnophis sirtalis THAM-nuh-FIS ser-TAL-is
 Trionychidae TRY-un-NIK-uh-dee
 Trogonophidae TROG-uh-NOH-fuh-dee
 Tropidophiidae TROP-uh-doh-FEE-uh-dee
 Typhlopidae ty-FLOP-uh-dee
Ungaliophis panamensis un-GALL-ee-OH-fis PAN-uh-MEN-sis

Uropeltidae YOOR-uh-PEL-tuh-dee
Varanidae vuh-RAN-uh-dee
Varanus salvadorii vuh-RAN-uhs SAL-vuh-DOR-ee-EYE
Viperidae VY-per-uh-dee
Xantusia vigilis ZAN-tuh-SEE-uh vih-JUH-lis
Xantusiidae ZAN-tuh-SEE-uh-dee
Xenopeltidae ZEE-noh-PELT-uh-dee
Xenopeltis unicolor ZEE-noh-PELT-uhs YOO-nih-KUH-ler
Xenosauridae ZEE-noh-SOR-uh-dee
Xenosaurus grandis ZEE-noh-SOR-uhs GRAN-duhs



Words to Know

A

Algae: Tiny plantlike growths that live in water and have no true roots, stems, or leaves.

Ambush: A method of hunting in which the animal finds a hiding place from which it can spring out to attack unsuspecting meal animals that wander past.

Amphibian: An animal with a skeleton inside the body and that spends part of its life in the water and part on land.

Amphisbaenians: A small group of reptiles that look somewhat like long earthworms, but with scales.

Annuli: Rings, such as those seen around the length of an earthworm and some wormlizards.

Antibodies: Substances that fight bacteria, which can cause health problems in humans.

Antivenin: An antidote, or remedy, that neutralizes, or makes ineffective, the poison from the bite of a venomous animal.

Arboreal: Describing an animal living in trees.

Arid: Describing areas with very little water, such as a desert area.

Autohemorrhaging: Bleeding that starts on its own and not because of an injury.

B

Barbel: A bit of flesh that dangles from the chins of some turtles.

Bask: To warm up the body, especially by lying in the sun; basking is seen in such animals as turtles and snakes.

Bay: A part of the sea that cuts into the coastline.

Billabong: An Australian word for a dried-up streambed.

Blunt: Not pointed.

Brittle: Easily broken.

Bromeliad: A plant that often grows high above the ground on the sides of trees.

Burrow: A tunnel or hole in the ground made by an animal for shelter.

C

Caecilians: Salamanderlike animals that live underground.

Camouflage: A way of hiding or disguising something by making it look like its surroundings.

Carapace: The upper shell of a turtle.

Carnivore: An animal that eats meat.

Carnivorous: Meat-eating.

Carrion: Dead animal flesh.

Caruncle: The toothlike part a hatchling reptile uses to break out of its egg.

Centipede: An animal with a segmented, wormlike body and many legs.

Clone: An exact duplicate, seen in a mother and her babies of parthenogenic species.

Cloud forest: A wet, tropical, mountain forest.

Clutch: A nest of eggs.

Cold-blooded: Having a body temperature that changes with the temperature of the surrounding environment.

Concave: Hollowed or curved inward.

Coniferous forest: A forest with trees that have seeds inside cones, such as pines; also called evergreen forest.

Constriction: A method snakes use to kill their prey, by wrapping their bodies around the prey animal and squeezing until it cannot breathe.

Constrictor: A snake that squeezes animals, usually to death, before eating them.

Continent: A large mass of land on planet Earth, such as Africa or South America.

Continental shelf: A shallow plain in the sea that forms the border of a continent, usually with a steep slope to the ocean floor.

Courtship: An animal's activities that are meant to attract a mate.

Crest: A ridge on an animal's body.

Crepuscular: Describing an animal active at twilight, that is, at dusk and dawn.

Crevice: A narrow opening or a crack.

Critically Endangered: Facing an extremely high risk of extinction in the wild in the near future.

Crustacean: An animal that lives in water and has a soft, segmented body covered by a hard shell, such as lobsters and shrimp.

D

Decayed: Rotting.

Deciduous forest: A forest with trees, such as maples, that lose their leaves in dry or cold weather.

Deflate: To cause to collapse by letting out the air.

Deforestation: Clearing land of trees to use the timber or make room for human settlement or farming.

Depression: A hollow or a hole.

Dew: Small drops of water that collect on cool surfaces, especially at night.

Dewlap: The flap of skin that lies under the chin.

Diameter: The width of a circle, measured as a straight line through the center.

Diurnal: Describing an animal active during the day.

Drought: A dry spell.

Dune: A hill of sand piled up by wind or water.

E

Ectothermic: Describing an animal whose body temperature changes when the outside air warms up or cools down; often referred to as “cold-blooded.”

Eggs: The reproductive cells that are made by female animals and that are fertilized by sperm, or reproductive cells of male animals.

Embryo: A developing baby that is not yet born.

Endangered: Facing a very high risk of extinction in the wild in the near future.

Endothermic: Describing an animal that uses its own energy to maintain a constant body temperature; often referred to as “warm-blooded.”

Equator: The imaginary circle around Earth midway between the North Pole and the South Pole, the points on Earth's surface that are farthest north and south, respectively.

Erosion: The wearing away of earth by wind or water.

Estivation: A period of inactivity during dry spells or during the summer.

Estuary: The wide part at the lower end of a river, where the river meets the sea.

Evolution: The process of change and development that an animal undergoes over time to adapt to its surroundings.

Extinct: No longer alive.

Extinction: Elimination or death, especially of an entire species of animal.

F

Fangs: Long, pointed teeth.

Flexible: Movable or bendable.

Forage: A style of hunting in which an animal wanders about looking for food.

Fossil: The remains, or parts, of animals that lived long ago, usually found set into rock or earth.

Fossorial species: Those that live underground.

Frill: Pleated or ruffled neck folds.

Fused: Firmly joined together.

G

Genus: Defined by scientists, a group of similar species. A group of similar genera (the plural of genus) make up a family.

Granular: Grainy like sand.

Grub: A wormlike young insect.

H

Habitat: The natural environment, or living area, of an animal.

Hatchling: A newly hatched young animal.

Herbivore: An animal that eats only plants.

Hibernate: Become inactive during the winter.

Hibernation: A period of inactivity during the winter.

Humus: A material made up of decayed, or rotting, plants and leaves that feeds soil and holds in water.

Hybrid: Young born to parents from two different species.

Hydrozoan: An ocean-living animal that has tentacles, or long thin body parts used for feeling or holding on to things.

Hyoid: A bone that supports the tongue.

I

Incubation: The period of time after eggs are laid and before they hatch, during which they develop.

Inflate: To make larger or expand.

Infrared vision: The ability to detect, or to “see,” heat.

Invertebrate: An animal, such as an insect, spider, or earthworm, that lacks a backbone.

Iridescent: Having the ability to turn light into many colors, much as rain can bend the sunlight into a rainbow; reflecting different colors depending on the light.

Iridescent scale: Seen in a few snakes, scales that shine different colors depending on how the light hits them.

J

Jacobson’s organ: Common in reptiles, an organ that connects to the roof of the mouth by a small opening, called a duct, and helps the animal to smell chemical odors picked up by the tongue.

Juvenile: A young animal.

K

Keel: A ridge on the upper shell of a turtle.

Keeled scale: On a snake, a scale with a ridge down the middle.

L

Lagoon: A shallow body of saltwater near the sea.

Larva: In many insects, such as beetles and butterflies, the life stage after the egg and before the pupa.

Ligament: Tough but flexible tissue that connects bones.

Limbs: Legs.

Lineage: A group of animals that connect species through time to their ancestors.

Live-bearing species: A species, or kind, of animal in which the females give birth to babies rather than laying eggs.

M

Mangrove: A tropical tree or shrub that forms thick growths along coastlines.

Marine: Having to do with the sea.

Migrate: To move from one area or climate to another to breed or feed.

Migration: Movement from one region or climate to another, usually for breeding or feeding.

Mimicry: Resemblance of one usually dangerous species by another usually harmless one.

Mollusk: An animal with a soft, unsegmented body usually covered by a shell, such as a snail or a clam.

Molt: As seen in snakes, the shedding of the outer skin.

Murky: Dim or dark.

Musky: Smelling earthy and sometimes stinky, like the spray of a skunk.

N

Native: Natural to a country, that is, produced by nature and not produced or brought in by humans.

Near Threatened: At risk of becoming threatened with extinction in the future.

Nocturnal: Describing an animal active at night.

Nostrils: Nose holes.

O

Omnivore: An animal that eats both plants and meat.

Omnivorous: Describing an animal that eats both plants and meat.

Opportunistic: Taking advantage of what is available, as in feeding on whatever food can be found.

Opportunistic hunters: Animals that will eat almost anything they happen upon if they are hungry.

Oscillation: In spade-headed wormlizards, the back-and-forth swiveling motion of the head that digs through the soil and forms the smooth sides of the tunnel.

Osteoderms: Bony plates that lie under the surface of the scaly skin in some reptiles, including crocodilians.

Oviparous: Describing an animal that produces and lays shelled eggs that later hatch into young.

Ovoviviparous: Describing a female that produces eggs that hatch inside her body just before she gives birth to the young.

P

Palate: A bony plate on the roof of the mouth.

Parthenogenesis: A type of reproduction where a female can have babies by herself without a male.

Parthenogenic species: An all-female species in which a female can become pregnant and have young by herself and without a male.

Pectoral: Relating to the chest area.

Plastron: The lower shell of a turtle.

Pollution: Poison, waste, or other material that makes the environment dirty and harmful to the health of living things.

Predator: An animal that hunts and kills other animals for food.

Prey: An animal hunted and caught for food.

Protrude: To stick out.

Pupa: In many insects, such as beetles and butterflies, the life stage after the larva and before the adult.

Pupil: The part of the eye through which light passes.

R

Rainforest: A tropical woodland area of evergreen trees that has heavy rainfall all year long.

Range: The area where an animal roams and feeds.

Retract: To pull backward.

Rodent: A small animal, such as a mouse, beaver, or hamster, with long front teeth that it uses for gnawing.

S

Sac: A pouch.

Sandbar: A ridge of sand built up by currents, or the flowing movement of water.

Savanna: A flat plain covered with grass and a few trees.

Scale: A clear, thin film or coating over the eyes or a flat, rigid plate that acts as part of a body covering.

Scent: The particular smell of an animal, which can be left on the surface over which it travels.

School: A large number of fish or other water-dwelling animals that swim together.

Scrub: A flat, dry area of land with small bushes.

Scrubland: Land covered with small bushes.

Scute: A bony or horny scale or plate.

Seasonal: Happening as part of the changes at the different times of the year.

Serpentine locomotion: Seen in snakes and legless lizards, the way they slither in an S-shaped motion.

Setae: Tiny hairs or hairlike projections.

Silt: Fine, tiny specks of earth that settle out of water or fall to the bottom.

Snout: Nose area, usually long and pointed.

Sockets: Hollow openings, usually where one body part fits into another.

Species: A group of animals that share many traits and can mate and produce young with one another.

Spectacle: A see-through scale that covers the eye; seen in snakes and some lizards that do not have blinking eyelids.

Sperm: The reproductive cells that are made by male animals and that fertilize the eggs of female animals.

Specimen: A single example that is considered typical of a group.

Squamates: The group of animals that includes the lizards, snakes, and wormlizards.

Stalking: A type of hunting in which the predator sneaks up on the prey before attacking.

Stratum corneum: The outer skin that snakes lose when they shed.

Subspecies: A smaller group within a species that typically lives in a particular area and usually has a slightly different look from the rest of the animals in the species.

Subtropical: Relating to regions that border on the tropics.

Swamp: A wetland that is only partly or now and then covered by water.

T

Tail: In snakes, the part of the body that occurs after the vent.

Temperate climate: Describing areas that have distinct seasons, including cold winters.

Tentacles: Long thin body parts used for feeling or for holding on to things.

Terrestrial: Describing an animal that lives on land.

Territorial: Describing an animal that is protective of a living or breeding area.

Territory: An animal's preferred living area, which is considered off-limits to other animals of the same species.

Toxic: Poisonous.

Trek: A journey, typically one that is long and difficult.

Trunk: In a snake, the portion of the body between the head and the tail.

Tubercles: The cone-shaped bumps on a snake's tail.

V

Venom: Poison, usually injected by snakes, bees, or scorpions by biting or stinging.

Venomous: Poisonous.

Vent: On a snake, a crosswise opening on the belly side and toward the rear of the animal.

Ventrals: In snakes, the scales on the underside of the animal, usually much larger than the scales on the snake's back and sides.

Vertebrate: An animal that has a backbone.

Vertical: Positioned straight up and down.

Vibrate: To move back and forth rapidly.

Viviparous: Describing a female that makes no eggs, but rather provides all of the food for her young through direct connections inside her body and gives birth to live babies.

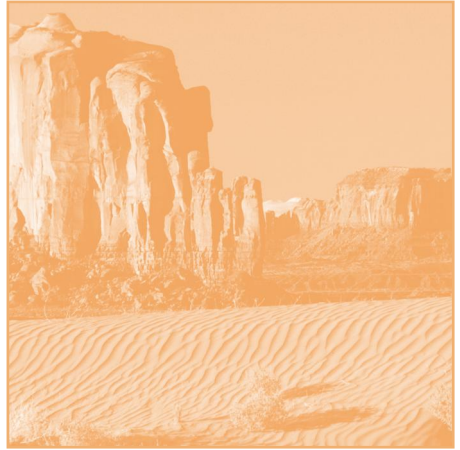
Vocal: Making sounds.

Vocal cord: Body part used to produce sound.

Vulnerable: Facing a high risk of extinction in the wild.

W

Wetland: Land that is covered with shallow water or that has very wet soil.



Getting to Know Reptiles

REPTILES

Snakes, crocodiles and alligators, lizards, and turtles might not look alike at first glance, but they all share certain features. These animals, plus the tuataras that resemble a cross between a prehistoric dinosaur and a present-day lizard, are reptiles. In all, the world holds 285 species of turtles, 23 crocodiles and alligators, two tuataras, 4,450 lizards, and 2,900 snakes. Scientists suspect that hundreds of other reptile species have yet to be discovered.

Scales

Almost all reptiles have thick tough skin with scales or scutes. Alligators have large heavy rectangular scales covering their bodies, while snakes often have thinner overlapping scales. Most snakes have larger and wider belly scales, which are known as scutes. Even turtles have noticeable scales on the legs and head. These scales and scutes can help protect the reptile from scraping its skin on the ground or from dangerous attacks by other animals that want to eat it. For land-living reptiles, the scales can also keep the body from drying out too quickly. Besides the scales on their legs, turtles also have a different type of scutes. The tops of the upper and lower shell are divided into large pieces, which are also known as scutes.

Reptiles come in many different sizes and colors. Some snakes grow to less than 12 inches (30.5 centimeters) long as adults, while others can reach 25 feet (7.7 meters). Likewise, a whole range of sizes separate the smallest of turtles at just a

People often see reptiles sunbathing, or basking, in the sun. (John M. Burnley, Photo Researchers, Inc. Reproduced by permission.)



few inches (centimeters) long from the largest, which have shells that can reach 8 feet (2.4 meters) in length. Many reptiles have dull drab colors that help them blend into their surroundings, but others are very brightly colored and patterned.

Body temperature

Reptiles are often called cold-blooded animals, but this description is only correct sometimes. A reptile actually changes its body temperature, becoming hotter when the outside temperature is warm, and colder when the outside temperature is cool. In other words, a reptile is only “cold-blooded” on cold days. This changing body temperature is called ectothermy (EK-toe-ther-mee): ecto means outside and thermy refers to the temperature. Reptiles, then, are ectothermic animals. In “warm-blooded” animals, such as human beings, the body has to stay about the same temperature all the time. If a person’s body temperature rises or falls more than just a few degrees, he or she can die. For the ectothermic reptiles, however, their body temperatures can swing 20 to 30° F (7 to 13° C)—and sometimes more—in a single day without causing any harm. Because they are ectothermic, reptiles do not have to use their energy to stay warm. Instead, they can simply let the sun warm them up by sunbathing, or basking, on a forest path or the shore of a river or lake. Ectothermy can also have a downside. Reptiles are slower on cooler days or in the cool morning or evening air, which can make them easy prey for attackers. Most reptiles,

however, hide themselves away when their bodies start to chill.

Venom

Not all reptiles are venomous, but many snakes and a few lizards are. Venom is a type of toxin, or poison. Venomous snakes generally have two fangs in their upper jaw—sometimes in the front of the mouth and sometimes in back. These fangs usually have grooves that send the venom down the tooth and into the prey. Unlike the snakes, the two venomous lizards, the Gila monster and the Mexican bearded lizard, store their venom in the lower jaw and deliver it through grooves in numerous teeth.

HOW DO REPTILES MOVE?

Walking

Although not all reptiles have legs, many of them do. Crocodiles and alligators, turtles, most lizards, and tuataras can walk on their four legs. Each leg ends in a foot with five or fewer claws. Usually they walk with their legs held out from the body, rather like a human would hold up his or her body when doing a push-up. Many of the smaller lizards, in particular, are very speedy, zipping across the ground at speeds that make their capture difficult. The exceptionally large lizards, known as Komodo dragons, usually walk very slowly, as do crocodiles, which often slide their bellies along the ground while walking. If necessary, however, both can run surprisingly fast. A few reptiles, such as the Nile crocodile and American crocodile, can even do a fast rabbitlike hop, called a gallop, to cover ground quickly. Some lizards can run on just their two hind legs, and the basilisk lizard is even able to run across the surface of a pond without sinking.

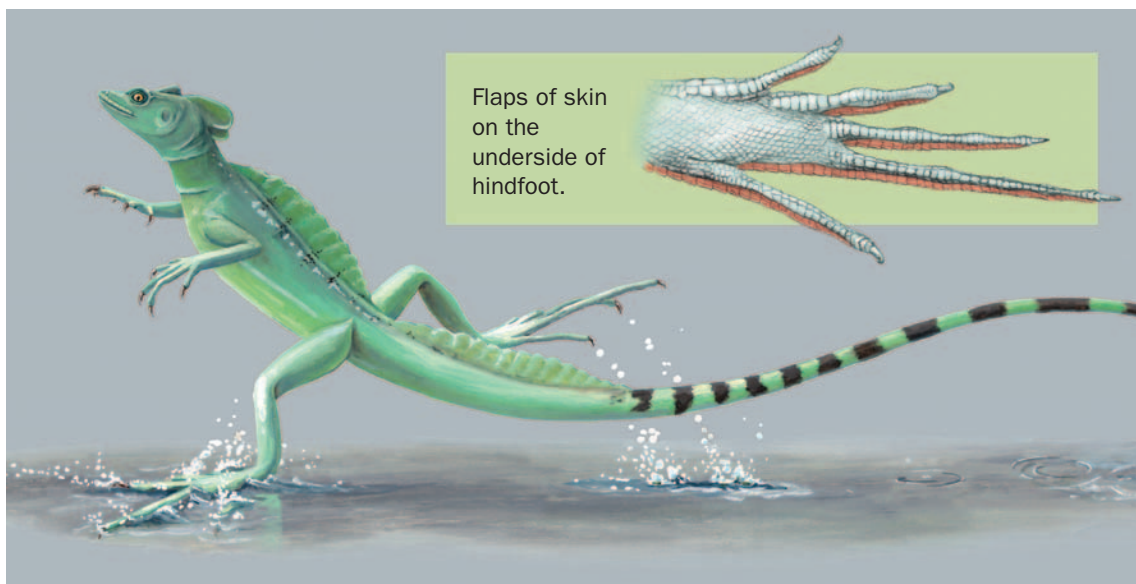
Slithering

Snakes slither, usually twisting and bending their bodies in an S-shaped pattern along the ground. This type of movement is called serpentine (SER-pen-teen) locomotion. Like the snakes, some lizards also have no legs. They move much the



FLYING REPTILES?

No reptiles can actually fly, but several can glide through the air much like a paper airplane. The flying tree snake, which is common in Singapore, flattens out its body to soar from one tree branch to a lower one. The common gliding lizard, also known as the common flying dragon, can likewise glide through the air, but it does so by stretching out a large flap of skin, as if opening a fan, on each side of the body. The flying geckos of Southeast Asia have numerous little flaps on their body, tail, legs, and head that help them to glide.



The green basilisk lizard is able to run across water aided by the flaps of skin on the underside of its hindfeet. (Illustration by Emily Damstra. Reproduced by permission.)

same way as snakes do. Occasionally, some lizards that have legs will slither instead of run. When they are in thick grass that makes running very difficult, some will lie down, hold the legs against the body, and begin to slither.

Swimming

Many turtles, alligators, and crocodiles spend most of their lives in the water. Turtles often have wide feet that they use to push them through the water. A few, like the seaturtles, even

Snakes slither, usually twisting and bending their bodies in an S-shaped pattern along the ground. (David Hughes/Bruce Coleman, Inc. Reproduced by permission.)



have feet that are shaped like paddles. Alligators and crocodiles have very powerful and long tails that propel and steer their bodies through the water. Many snakes are also excellent swimmers, moving through lakes and streams with the same serpentine locomotion they use to slither on land.

WHAT DO REPTILES EAT?

Carnivores

Many reptiles are meat-eaters, or carnivores (KAR-nih-vores). Some of them, especially the smaller lizards and snakes, eat mainly insects, spiders, worms, and other invertebrates (in-VER-teh-brehts), which are animals without backbones. Larger snakes often eat mammals, amphibians, other reptiles, fishes, and birds. A number of snakes and lizards also eat eggs. Snakes usually will only eat living animals, but other species, including snapping turtles, will eat dead, even rotting animals that they find.

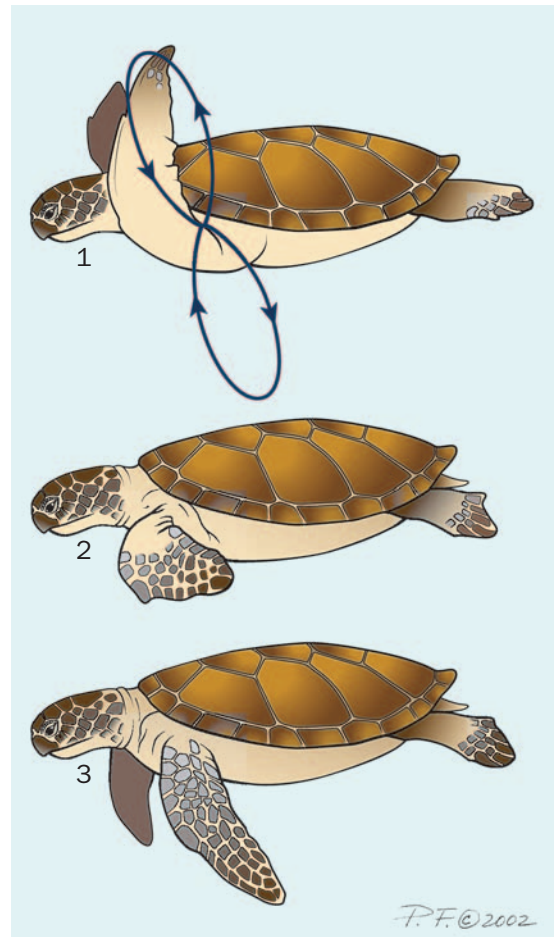
Plant eaters

A few reptiles, especially some of the turtle species and a few lizards, eat plants. Animals that eat plants are called herbivores (ER-bih-vores). A few animals will eat both meat and plants. These are called omnivores (OM-nih-vores). Some turtles, including the commonly seen painted turtles, will switch from a mostly meat diet to one that is mostly plants when animal prey are hard to find.

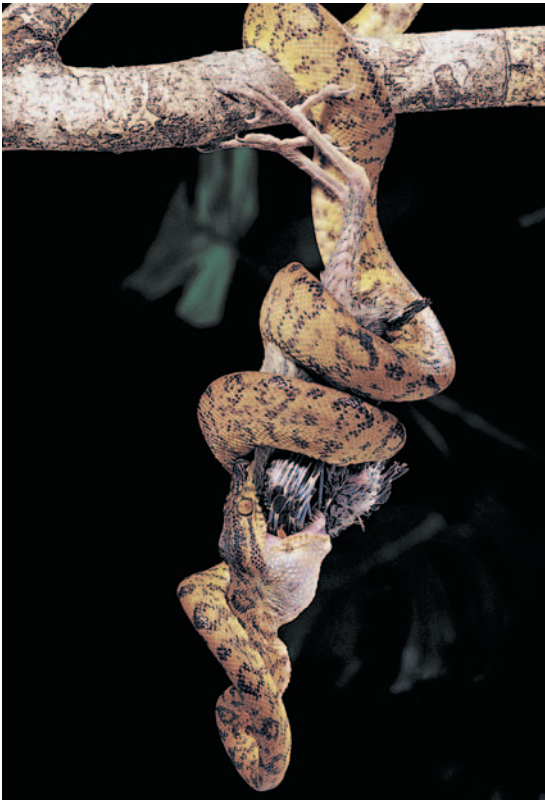
REPTILES AS PREDATORS AND PREY

As predators

Predators (PREH-duh-ters) are animals that hunt and kill other animals for food. Many reptiles hunt by ambush, which means that they find a good hiding spot or lie very still and wait for a prey animal to happen by. Then they lunge out and grab their prey. Other reptiles hunt by foraging, when they crawl, slither, or swim about looking for something to eat. Many



Seaturtle swimming strokes.
(Illustration by Patricia Ferrer.
Reproduced by permission.)



An Amazon tree boa eating a bird. (Joe McDonald, Bruce Coleman Inc. Reproduced by permission.)

reptiles, including lizards and turtles, simply snap their mouths around the prey and swallow it. Crocodiles and alligators clamp their jaws around larger prey, such as deer, drag them underwater to drown, and then tear off hunks of flesh. Snakes usually swallow their meals whole, often by unhinging their jaws. Many snakes are venomous, which allows them to inject a toxin into the prey to either kill it or knock it out.

Some reptiles, especially the lizards, mainly use their eyes to spot their prey. Snakes have an excellent sense of smell and are able to pick up scents from the air and from the ground with the tongue, which they flick again and again while looking for food. Some snakes, including the pit vipers, have small holes on the front of the face. These holes, or pits, are covered with a thin sheet of detectors that can pick up the heat given off by a prey animal. Snakes are also able to sense ground vibrations through the jaw bone, which connects to the ear. They can not only feel the ground move, but they can also hear it.

As prey

Prey are those animals that are hunted by other animals for food. Eagles, hawks, other large birds, along with some mammals, eat snakes and lizards. In fact, some snakes and lizards eat other snakes and lizards. One of the biggest threats to turtles come from mammals that dig up their nests and eat their eggs.

WHERE REPTILES LIVE

Underground reptiles

The tuataras, many lizards, and some snakes, including the blind snakes, spend most of their time underground in burrows, or beneath rocks, logs, or other ground covers. Some of them stay underground all day and only come out at night. Others stay underground all night and sneak out during the day. Some burrowing reptiles dig their own burrows, but many others simply move into the burrow of another animal.



Crocodiles may grab an animal on shore, but will drag it into the water to drown it. (Fritz Polkina/Bruce Coleman, Inc. Reproduced by permission.)

Freshwater reptiles

Alligators and crocodiles, many turtles, some snakes, and a few lizards live in freshwater lakes, ponds, rivers, and streams. Depending on the species, they may spend a good deal of time every day on shore basking in a sunny spot. Some will even do some hunting on land. Crocodiles, for instance, may grab a prey animal on shore but will then drag it into the water to drown it.

Sea reptiles

Among the reptiles, the seaturtles are most known for their association with the oceans. With their paddlelike front legs, they can glide easily through the water and cover very long distances, often migrating hundreds of miles (kilometers) between their nesting beaches in warm climates and their feeding areas in cooler climates. The leatherback seaturtle migrates the farthest, taking trips of up to 3,100 miles (5,000 kilometers) from its nesting place to a feeding site. Some snakes also live in the ocean. The seasnakes make their home in coral reefs, where they eat eels and fishes.

Tree reptiles

Animals that live in trees are said to be arboreal (pronounced ar-BOR-ee-ul). Some reptiles are arboreal. These include many snakes, even large ones like the emerald tree boa that can grow to 7.3 feet (2.2 meters) in length. Many lizards are also excellent climbers and slither through trees looking for insects or bird eggs to eat.



NEW REPTILES

Scientists believe that many more reptiles live on Earth than those they know about. In fact, they are continuing to find new reptiles today.

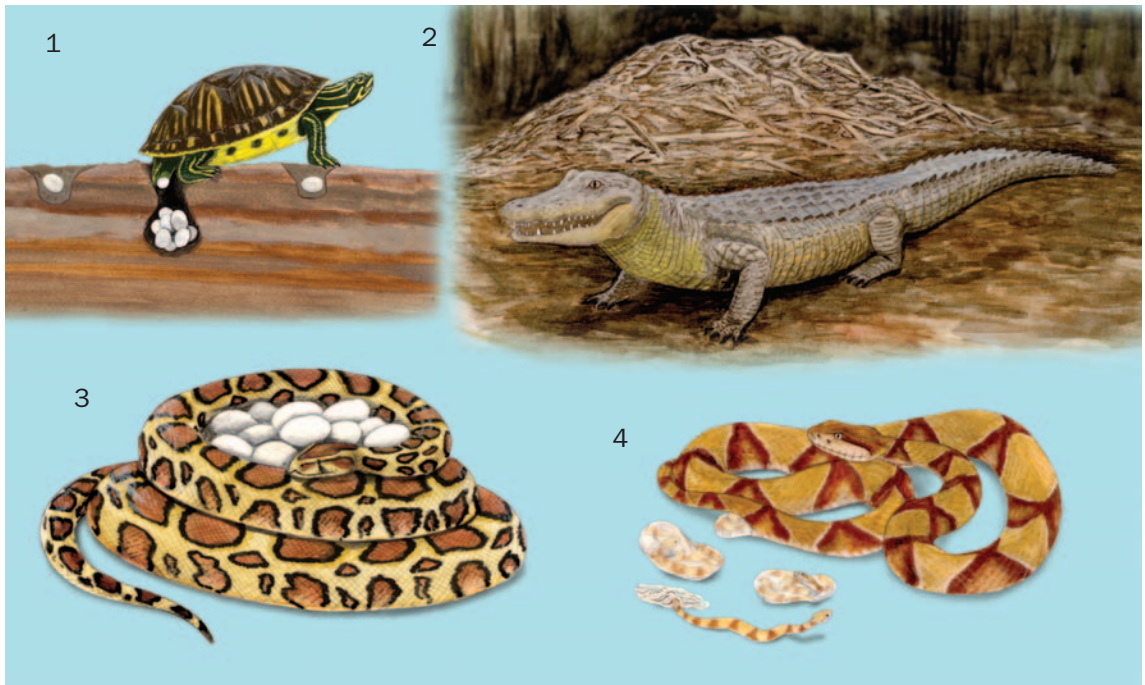
Sometimes, they discover new species inside old ones. In other words, they decide that a snake or lizard that they always thought was one species is actually two similar-looking species. In 2003, for example, Wolfgang Waster of the School of Biological Sciences at the University of Wales and keepers from the London Zoo received a group of strangely colored spitting cobras. After taking a closer look, they discovered that the snakes were actually a completely different and previously unknown species, which they called the Nubian cobra. Similarly, zoologist Frank Burbrink studied American corn snakes and found that one was so different from the others that it should be its own

species. He named the snake Slowinski's corn snake in honor of snake researcher Joseph Slowinski, who died in 2001 when he was bitten by venomous snake.

Besides finding new species in old ones, scientists are also discovering new never-before-seen species in remote places where few humans have ever traveled. In 2001, for example, scientists Blair Hedges of Pennsylvania State University and Richard Thomas of the University of Puerto Rico discovered a tiny lizard that is smaller than any other known lizard. This little reptile, which measures barely more than one-half inch (16 millimeters) long, is a little gecko that lives on the island of Beata in the Dominican Republic. This species is one of more than four dozen new reptiles and amphibians that Hedges and Thomas have discovered in hard-to-reach spots in the Caribbean.

REPRODUCTION

Most female reptiles lay eggs, but some give birth to babies. Some of the newborn babies may have actually hatched from eggs while they were still inside the mother. Female reptiles all lay their eggs or give birth to their babies on land. Even those that live in the water for the rest of the year crawl onto shore to have their young. Tuataras lay eggs in their burrows. Some female turtles and crocodiles bury their eggs on shore or farther inland. A few turtle species lay their eggs in leaf piles. After laying the eggs, a female turtle leaves the nest, and the young are on their own. Crocodiles care for their young, bringing the new hatchlings from the nest site to the water. Snakes and



lizards may lay eggs or have babies. In some species, the female may remain with the eggs and/or the young, although scientists are unsure how much real protection or care many of the mother snakes actually provide.

REPTILES AND PEOPLE

Many people keep reptiles as pets. This can be a problem if the animal bites, if it grows too large, or if it lives too long. Some snakes, for example, can grow to be 6 feet (1.8 meters) long or more, and some turtles can live to be 100 years old. In the wild, most people only see reptiles when the animals are warming themselves in the sun. Usually, the reptile will leave the area as the person draws near. If the animal is surprised, however, some reptiles may bite. Not all snakes are venomous, but some are. A bite from a venomous snake can be dangerous and even deadly and requires an immediate visit to the hospital.

ENDANGERED REPTILES

Reptiles in danger

Many, many species of reptiles may disappear from the Earth soon, if they do not receive some protection. Two-

Egg laying strategies.

1. Peninsula cooter turtle;

2. American alligator;

3. Python; 4. Copperhead.

(Illustration by Dan Erickson.

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Reptilian visual displays:

1. Cottonmouth uses gaping mouth as a defensive warning; 2. Frilled lizard looks larger as a defensive display; 3. A ringneck snake draws attention away from its head and shows its coloration as a defense; 4. The alligator snapping turtle uses a food lure to attract its prey; 5. and 6. Territorial or mating displays for green anole (5) and tuatara (6). (Illustration by Dan Erickson. Reproduced by permission.)

thirds of all turtle species, for example, are now listed by the World Conservation Union (IUCN) as being at risk. Overall, the IUCN counts 453 species of reptiles, or more than one in every six species, as being at some risk. Moreover, scientists know so little about many species that others may be at risk, too.

The decline in reptile populations is commonly a result of habitat destruction or of overhunting for their meat or skin or for the pet trade. For turtles, much of the danger comes from the growing number of predator animals that dig up turtle nests and eat the eggs. Scientists estimate, for instance, that 75 to 90



A KwaZulu-Natal Nature Conservation Service staff member cuts notches into the carapace of a loggerhead turtle hatchling as part of a research project. (©Roger De La Harpe: Gallo Images/CORBIS. Reproduced by permission.)

percent of the eggs from some species of North American turtles are lost each year to such predators.

Saving endangered reptiles

In some cases, scientists, government agencies, and/or other concerned groups are protecting the land where the animals live and setting up laws that prevent overhunting. Many zoos are also helping by trying to breed their own captive reptiles. This is especially important for those species that are already very rare.

Too late to save

According to the IUCN, twenty-one species of reptiles are extinct. This includes three snakes, eleven lizards, and seven turtles.

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order

CHAPTER

DINOSAURS

Class: Reptilia

Superorder: Dinosauria

Number of orders: 2 orders



PHYSICAL CHARACTERISTICS

The dinosaurs are a large group of reptiles that lived from 230 to 65 million years ago. Some, such as the well-known *Tyrannosaurus rex*, were enormous meat-eating animals. Others, however, were small and timid creatures that nibbled on plants.

Scientists divide the dinosaurs into two orders. One order is Saurischia, which includes the theropods (THAIR-oh-pods) that walked on their two hind legs and were mostly meat-eating dinosaurs and the sauropods (SAWR-oh-pods) that walked on all fours and ate plants. The theropods had more primitive features, including jagged teeth, and some, such as the *Ceratosaurus*, had hornlike knobs jutting out of their skulls. *Tyrannosaurus rex* was a theropod. Although it was quite large at 40 to 50 feet (12.2 to 15.2 meters) long, its ancestors only grew to about 10 feet (3 meters) long.

The sauropods looked much different than the theropods. They had very long necks and tiny heads. Some of them were able to lift their front legs off the ground and grab leaves or other things with their hands. Other species, including *Brachiosaurus*, had longer front legs than hind legs, similar to the arrangement in current-day giraffes. Their tall front legs, combined with their overly long necks, helped them easily reach food even at the tops of most trees.

The other order within the dinosaurs is Ornithischia, which included those dinosaurs that ate plants and had hip bones that looked like those found in present-day birds. Many of them had

phylum

class

subclass

● **order**

monotypic order

suborder

family

crests, beaks, horns, or helmets, and some had armor-like plates, called scutes, covering their bodies and occasionally spikes. Stegosaurus are an example of an Ornithischian. These dinosaurs had armor-like spines down the middle of the back and spiked tails. The Ornithischia also includes the duckbill dinosaurs with their wide snouts.

Within these two orders of dinosaurs, the animals are further split into several hundred smaller groups, called genera (jen-AIR-uh). One or more species is grouped into each genus (JEAN-us), which is the singular of genera.

Although the name dinosaur actually means “terrible lizards,” dinosaurs are not lizards and are different from all other groups of reptiles. One of the major differences between dinosaurs and other reptiles is in the way they moved. Lizards and crocodiles walk with their legs held out to the side, in the same type of position a person’s arms take when doing pushups. A few dinosaurs sprawled their front legs like a lizard, but the vast majority of them walked like a dog or cat—with the legs directly below the hips and shoulders.

Many scientists also now suspect that at least some of the dinosaurs were warm-blooded, instead of cold-blooded like other reptiles. A warm-blooded animal, more properly called an endothermic (EN-doe-THER-mik) animal, uses its own energy to keep its body at a constant temperature. Cold-blooded, or ectothermic (EK-toe-THER-mik), animals get their body heat from an outside source, like the warmth of the sun.

Dinosaurs came in many shapes and sizes. The *Seismosaurus*, or “earth-shaking dinosaur,” may have been the longest at 120 to 150 feet (36.6 to 45.7 meters) long. The heaviest may have been the *Argentinosaurus*, which grew to 100 to 130 feet (30.5 to 39.6 meters) long and weighed 110 tons (99,800 kilograms). Other enormous dinosaurs include the *Supersaurus* at 100 feet (30.5 meters) long and about 50 tons (45,000 kilograms) and the *Brachiosaurus* at 85 feet (25.9 meters) long and about 75 tons (68,000 kilograms). The *Tyrannosaurus rex*, a name that is often shortened to *T. rex*, was considerably smaller at 40 to 50 feet (12.2 to 15.2 meters) long and 6 tons (5,400 kilograms) in weight. Since *T. rex* stood on its hind legs rather than on all fours, it towered over most other dinosaurs. Other similarly sized meat-eating dinosaurs were the *Gigantosaurus*, *Spinosaurus*, and *Carcharodontosaurus*. All dinosaurs were not giants, however. Some, such as the *Saltopus* and *Lesothosaurus*,

were only 24 to 36 inches (61 to 91 centimeters) long, and the tiny *Microraptor*'s full-grown size may have been only about 16 inches (41 centimeters) long.

GEOGRAPHIC RANGE

The Earth that the early dinosaurs knew looked much different than the Earth does today. The planet had a single, huge land mass, called Pangaea, and the dinosaurs lived over much of this area, particularly in the warmer climates. About 180 million years ago—50 million years after the dinosaurs first evolved—Pangaea began to split up and eventually formed the continents seen on Earth today. Given such huge changes, a fossil found nowadays in Germany, for example, says nothing about the location of the dinosaur that left it 220 million years ago.

HABITAT

Because scientists are studying fossils from many millions of years ago, rather than living animals, they usually cannot tell much about the dinosaur's habitat. They do, however, suspect that none of them lived in the water. Although a few dinosaurs may have been able to keep their bodies afloat for brief periods, or could wade to catch fish, none were full-time swimmers. Some scientists believe that sauropod dinosaurs may have been able to float and, based on footprints left behind, think they pushed themselves along by bouncing their front feet on the bottom of the pond or lake.

DIET

About two-thirds of all genera contain dinosaurs that were plant eaters, and a third of the genera include meat-eating dinosaurs. Scientists can determine whether a dinosaur ate meat or plants by looking at its teeth. The teeth of meat-eaters, also known as carnivores (KAR-nih-voars), are pointed for tearing flesh. The teeth of a plant-eater, or herbivore (ER-bih-voar), are flatter for grinding grasses and leaves. Studies of other dinosaur bones can also reveal information about their diet. One study, for instance, showed that some dinosaurs were cannibals. By looking at teeth marks on the bones of certain dinosaurs and comparing the marks to the teeth of the same species, the scientists figured out that the reptile was eating its own kind. This particular species, a theropod called *Majungatholus atopus*, grew to 29.5 feet (9 meters) long.

BEHAVIOR AND REPRODUCTION

With almost nothing but fossils to study, scientists can only guess at most dinosaur behavior. For example, although *T. rex* is often described as a ferocious predator, scientists only know that it had a skeleton that likely supported a strong body, and it had the jaws and teeth necessary to eat large prey animals. It is possible, however, that *T. rex* never even attacked live animals, but instead ate only animals that were already dead. Recently, scientists think they may have found evidence that some dinosaurs were social animals, which means that they spent time together in groups. They based this idea on a fossil find in Patagonia, where the bones of six, large, carnivorous dinosaurs were found huddled together in one area. The scientists think the dinosaurs, a new species that measures 40 feet (12.2 meters) long and had sharp and bladelike teeth, may have hunted together so they could attack and kill sauropods that grew to at least twice their size. Scientists believe some dinosaurs were social because their bones suggest that they were able to make loud noises. The lambeosaurs, for instance, had sound-producing tubes inside the skull, and scientists suspect that the animals communicated with one another.

Scientists sometimes find dinosaur footprints that have been preserved over time. From these, they can learn how the animal moved. Footprints of ornithomimids, which were ostrich-like dinosaurs, show that they could run at least 25 miles (40 kilometers) an hour, while those of a 3-foot-long (9 meter) meat eater called a *Megalosaurus* could zip along on its hind legs at speeds of 29 miles (48 kilometers) an hour. By looking at the bones of dinosaurs, scientists can also guess their fastest running speed. A recent study of *T. rex* bones shows that it probably could run no faster than the much smaller ornithomimids.

Scientists have recently found many dinosaur eggs, some of them with young still inside. A group of *Allosaurus* eggs found in Portugal provided some clues to the way they were born. The egg shells were covered with tiny holes, called pores, and looked very much like the pore-covered eggs of current-day crocodilians. The pores allow air to flow into the eggs, so the growing babies can breathe. Based on these findings, scientists believe the female dinosaurs of this species laid their eggs in mounds of vegetation or buried them, just as the now-living crocodilians do.

One of the best places in the world to find dinosaur fossils is Mongolia. In 1993, scientists learned that it was also an excellent

place to find eggs with developing babies, called embryos (EM-bree-ohs), still inside. Here, they discovered a nest containing the first embryo ever found of a meat-eating dinosaur. It was a theropod, called an oviraptorid, that looked much like an ostrich, and the embryo dated back 70 to 80 million years ago. Interestingly, they also found the skulls of two small velociraptors in the nest. Were the velociraptors there to eat the eggs, or had the mother oviraptorid brought the velociraptors to feed her babies? Scientists do not know for sure. Some even guess that the mother velociraptor may have laid her eggs in the oviraptorid nest. If the oviraptorid mother did not notice the intruders, she would raise them as her own.

DINOSAURS AND PEOPLE

Despite the pictures in some cartoons and science fiction movies that show cave people living at the same time as the dinosaurs, scientists know that this is not true. By dating dinosaur fossils, they can definitely state that dinosaurs lived between 230 to 65 million years ago. Humans did not evolve until about one million years ago. Nonetheless, people nowadays are very interested in these reptiles from the planet's past. Television programs, films, books, web sites, and entire museum wings are devoted to the description or study of these animals.

CONSERVATION STATUS

The dinosaurs became extinct 65 million years ago. Their deaths likely resulted from a huge asteroid, a rock from outer space, that slammed into the Earth, probably near the Yucatan Peninsula of Mexico. The impact from the 4 to 9 mile-wide (6 to 15 kilometer) asteroid sent up a thick plume of dust and caused a chain reaction that resulted in a severe change in the planet's climate. For years afterward, the sun was unable to penetrate the dark curtain of dust. Temperatures around the world began to drop. Without sunlight, plants died, and with fewer plants to eat, many herbivores also perished. With fewer and



BRING BACK THE DINOS!

Movies and TV shows sometimes pretend that humans today can bring the extinct dinosaurs back to life by growing them from bits of their DNA found in fossils. In one such film, called "Jurassic Park," a scientist found dinosaur blood in the stomachs of prehistoric blood-sucking insects that had been preserved through the ages in tree sap. The blood contained DNA, which is found in each of a body's cells and holds the instructions for making the animal. In the film, he was able to create a dinosaur from that DNA. Although scientists do sometimes find prehistoric insects, they have yet to find any blood inside, whether from a dinosaur or not. Even if they did, any DNA in the ancient blood would most likely be in such bad shape that it would be useless.

fewer herbivores to eat, the carnivores may have begun to eat each other, until they also disappeared. Scientists believe that one group of dinosaurs survived the great extinction, however. These were the dromaeosaurids that eventually evolved into the birds. For this reason, some books refer to birds as modern-day dinosaurs.

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TURTLES AND TORTOISES

Testudines

Class: Reptilia

Order: Testudines

Number of families: 14 families

order

CHAPTER

phylum

class

subclass

● **order**

monotypic order

suborder

family

PHYSICAL CHARACTERISTICS

Turtles and tortoises, which are in the order Testudines, have bony upper and lower shells that surround much of the body. The upper shell, or carapace (KARE-a-pays), can be tall and rounded, can be flat, or can be some shape in between. The lower shell, or plastron (PLAS-trun), can cover most or just a portion of the bottom of the animal, depending on the species. In most cases, the upper shell connects to the lower shell by way of a bony bridge. In some species, the bridge is made of more flexible tissue called ligament (LIH-guh-ment). The hard shell often is covered with large scales called scutes (SCOOTs). In some species, new scutes grow under the old ones, and the old ones pile up. A person can count the number of scutes in the pile to tell how old the turtle is. Softshell turtles have no scutes. They do have small bony shells, but the bones are covered with leathery or rubbery skin.

Besides shells, another feature of turtles and tortoises is that they have no teeth. Instead they have hard, flat surfaces on their jaws that allow them to grip and tear off bits of plants or animals for feeding. Sometimes these surfaces come to a sharp point in front and look much like the hook on the end of a hawk's or eagle's beak. Turtles with such pointed upper jaws are often said to have horny beaks.

Turtles and tortoises, like birds, dogs, humans, and other animals, are vertebrates (VER-teh-brehts), which means they have a backbone. Turtles and tortoises are unlike all other vertebrates in that their hip and shoulder bones are inside the rib cage instead of outside because the ribs are attached to the upper and

lower shells. If the shoulder and hip bones were outside the rib cage, they would have to be outside the shell.

Many turtles and tortoises have long necks, which they can pull back or stretch out. Because some species can pull their necks straight back and others can only pull them sideways, scientists often describe them as being in the hidden-necked group, called Cryptodira, or in the side-necked group, called Pleurodira. A hidden-necked turtle can pull its neck straight back and usually tuck its whole neck and head inside the shell. A side-necked turtle pulls its neck back sideways, often tucking the neck and head along the side of the body and against the bridge between the upper and lower shells.

Turtles come in many sizes. The largest living species is the leatherback sea turtle, which can weigh up to 1,191 pounds (540 kilograms), or more than half a ton. The upper shell can become 8 feet (2.4 meters) long. Some of the smallest of the Testudines are the speckled cape tortoise, flattened musk turtle, and bog turtle. The carapace on each of these three animals barely reaches 4.7 inches (12 centimeters) long.

GEOGRAPHIC RANGE

Turtles and tortoises live on all continents except Antarctica.

HABITAT

Depending on the species, turtles and tortoises can live on land, in fresh water, in the ocean, and along the coast. They live on many of the larger islands of the oceans and on every continent of the world except Antarctica.

DIET

Some species of turtles and tortoises are almost completely vegetarian, some eat almost nothing but meat, and still others eat a mix of meat and plants. Many turtles are opportunistic (ah-per-too-NIS-tik) feeders, meaning that they eat just about anything they can find, from fruits and leaves to live tadpoles and bits of dead fish. In some species, baby turtles eat mostly insects and other meat but switch to mostly plants as they get older.

BEHAVIOR AND REPRODUCTION

One of the most commonly known behaviors of turtles and tortoises is their ability to pull their legs, tail, neck, and head inside the shell. Many of them hide from attackers this way, but

not all of them are able to do it. Side-necked turtles, for example, can pull in the tail and legs but can only tuck their necks along the bridge. Other species, like the big-headed turtle, are hidden-necked but their heads are too large to fit inside the shell. Other turtles have hinges in the lower shell that allow them to draw the lower and upper shells tight against one another once the head, neck, legs, and tail are inside. A few species even have hinges on the upper shell. Attacking animals, or predators (PREH-duh-ters), find it very difficult to get at the turtle's soft body inside such a tightly closed shell, and the turtle usually survives without harm. Besides protecting the turtle from attackers, the shells protect the turtle from drying out too much on hot, dry days. Hinges in the back of the plastron also allow the shell to open wide enough for some female turtles to lay large eggs.

Many water-living turtles are excellent swimmers. Some, such as leatherback turtles, have paddle-like front legs that help them swim hundreds of miles in a year. Others, such as soft-shell turtles, have webbing between their toes that helps them sweep through the water. Some species of water-living turtles, however, are poor swimmers. American mud and musk turtles, for example, are small to medium-sized turtles that move slowly through the water by walking across the bottom rather than swimming. Land-living turtles and tortoises can get around quite well on the ground, although their shells do not allow enough leg movement for fast running.

Turtles and tortoises are able to protect themselves from predators by hiding inside their shells and in other ways. Many turtles have musk glands, which are small sacs that ooze a substance with a strong odor. This odor may be enough to make a predator stop its attack and leave the area. Some turtles fight back with strong bites. Snapping turtles, for example, are vicious and quickly fling out their long necks to bite at anything or anyone coming too close. Besides having a hard bite, snapping turtles have sharp claws that can badly scratch anyone who picks up the turtle from behind. Other species that are quick to bite include softshell and musk turtles.

During mating season, or courtship, the males of many species of turtles and tortoises try to attract females by methods that can range from head bobbing and gentle rubbing against the female to biting her legs or ramming his shell into hers. Some species, on the other hand, have no such courtship behaviors. Species that live in warmer areas may mate and nest at various times of

the year, but those that live in cooler areas usually mate in the fall or spring and nest in the spring or summer. In many species, the female can mate once and lay eggs from that mating for several years.

Most female turtles and tortoises nest by finding a spot on dry land, digging a hole, dropping the eggs inside, and burying them. A few species skip making a hole and simply lay their eggs among leaves on the surface of the ground. Most turtles and tortoises provide no further care for their eggs or young. The Asian giant tortoise is an exception. The female of this species lays her eggs and stays with the nest for a few days to keep away predators. Most of the smaller species of turtles and tortoises lay one to four eggs at a time, but larger species can lay fifty or more. For most turtles and tortoises, the temperature of the nest controls whether the eggs hatch into males or females. A very warm nest usually produces females, and a cooler nest produces males. In some species, an extremely cold nest temperature produces females too. In a few species, the nests have about equal numbers of males and females, no matter what the temperature of the nest. Newly hatched turtles and tortoises, or hatchlings, have a small, hard, tooth-like part on the upper jaw called a caruncle (KAR-un-kul), which helps them break out of the egg. Hatchlings usually head straight for the water or for a hiding spot on land, but a few species that hatch during cold winter months stay underground until spring. Adults of many species that live in colder climates enter a state of deep sleep, or hibernation (high-bur-NAY-shun), during the winter months. Many species that live in hotter areas survive dry weather by entering a state of deep sleep known as estivation (est-ih-VAY-shun).

TURTLES, TORTOISES, AND PEOPLE

Many people hunt turtles for food or to use in making traditional medicines. Humans also collect many kinds of turtles and tortoises for the pet trade.



HOW TURTLES AND TORTOISES USE THEIR SHELLS

A turtle's shell can be important in several ways. It can help the turtle protect itself from attacking animals. The shells of some turtles are so thick and strong that they can even resist the bite of a large crocodile. Other turtles, such as Asian river turtles, often dive very deeply, where the water pressure would be severe enough to crush their lungs if they were not protected by the shell. In turtles that live in very dry places, the shell provides a shield from the sun and helps the turtle keep from drying out too much. Tortoises, which live only on land, use their shells for yet another purpose. They collect rain in the crevices of their upper shells and then tip their bodies forward so the water runs down the sides and into their mouths.

CONSERVATION STATUS

According to the World Conservation Union (IUCN), nearly half of all living species of turtles and tortoises are at risk of becoming extinct. The U.S. Fish and Wildlife Service lists thirteen U.S. species and twenty-four foreign species as Endangered. Many species are at risk because of overhunting and overcollecting or because their habitat is disappearing. Efforts are under way to protect many species.

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family CHAPTER

PIG-NOSE TURTLE

Carettochelyidae

Class: Reptilia

Order: Testudines

Family: Carettochelyidae

One species: Pig-nose turtle
(*Carettochekys
insculpta*)

PHYSICAL CHARACTERISTICS

This family has only one member: the pig-nose turtle. This is quite a large freshwater turtle, with an upper shell that can reach 22 inches (56 centimeters) in length and 14 inches (35.6 centimeters) in width. It may weigh up to 50 pounds (22.7 kilograms). It often swims with just its long snout sticking out of the water. That long snout is one of its most notable features. A fleshy, tube-shaped structure, it is similar in appearance to the snout of a pig. The shell of the pig-nose turtle is also different from that of most other turtles. The shells of most turtles are covered in bony plates, called “scutes” (SCOOTs). The pig-nose turtle, on the other hand, has a hard shell with a leathery covering.

This turtle also has long front legs that can stretch to a length almost half as long as the carapace (KARE-a-pays), or upper shell. The legs are flat and wide, like paddles or flippers. In fact, the limbs, or legs, more nearly look like the front legs of marine turtles, or turtles that live in the sea, than those of other freshwater turtles. Each front limb is tipped with two claws. In color, the turtle is mostly olive or gray on the tops of its limbs and high-domed upper shell and is whitish or yellowish on its bottom shell, or plastron (PLAS-trun), and on its chin, lower neck, and the undersides of its limbs. Males and females look very much alike, except for the male’s larger tail. Besides their smaller size, juveniles (JOO-vuh-nuhls), or young turtles, differ from adults in the smoothness of the carapace. The juvenile carapace has a lumpy ridge, called a “keel,” down the middle and is jagged along the edge, whereas the adult carapace does

phylum

class

subclass

order

monotypic order

suborder

▲ family



A TURTLE BY ANY OTHER NAME

Although the family Carettochelyidae contains only one species, a person might think several exist. The reason is that the one species, *Carettochelys insculpta*, goes by the common names pig-nose turtle, pig-nosed turtle, Fly River turtle, and pitted-shelled turtle, to name just a few. They are one and the same turtle. Sometimes common names describe a body feature. For instance, “pig-nose” refers to the turtle’s piglike snout. Common names can also identify the species’ home. “Fly River,” for example, names one of the places the turtle is found in New Guinea.

not have a keel anywhere except toward the back, and it is rounded at the edge.

At one time scientists believed that these turtles should be included with the side-necked turtles, a group known as the Pleurodira, rather than the hidden-necked turtles, or the Cryptodira. The better-known hidden-necked turtles pull their heads and necks straight back into their shells, whereas side-necked turtles fold their necks sideways. Scientists based their decision mostly on the location of the first turtle discovered back in the late 1800s. The original specimen (SPEH-suh-muhn), or example, was not whole; it was missing the part of its backbone that would have shown scientists whether it was a side-necked or a hidden-necked turtle. Because it was found in New Guinea and all of the other turtles known from New Guinea or from Australia at that time were of the side-necked variety, the scientific community assumed that the pig-nose turtle must be a side-necked turtle too. As more of these turtles turned up,

however, scientists were able to take a closer look at the backbone, and they discovered that this species should be considered a hidden-necked turtle.

GEOGRAPHIC RANGE

This turtle is found in southern New Guinea and northern Australia.

HABITAT

The pig-nose turtle usually lives in freshwater rivers, lakes, swamps, and other water bodies with shady shorelines. Sometimes it makes its home in saltier estuaries (EHS-chew-air-eez), or the wide parts at the lower end of rivers that link these water bodies to the ocean. They tend to prefer slower-moving and even unmoving waters that have soft bottoms of silt, or loose earth, on top of sand or gravel. The pig-nose turtle is sometimes also called Fly River turtle, because it is found in the Fly River in Papua, New Guinea. Scientists once thought the turtle lived only in New Guinea, but ten of the turtles were discovered in Australia’s Daly

River in 1970. They later were also found in the Alligator River system of Australia about 240 miles (386 kilometers) from the Daly River site, as well as other places in northern Australia.

DIET

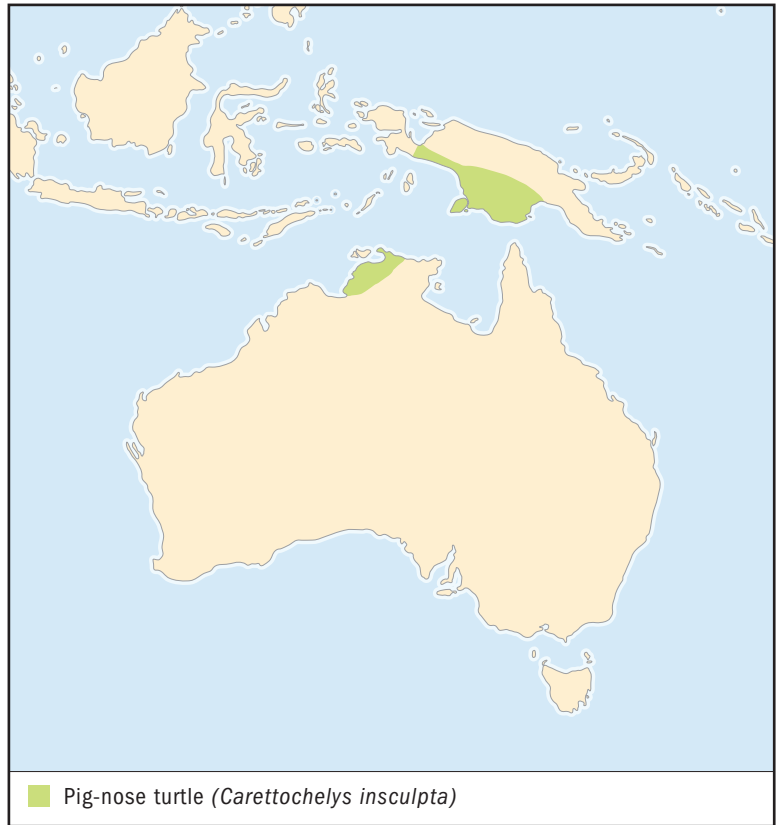
Pig-nose turtles will eat just about anything they can find. They seem to prefer plants; they especially like figs and other fruits that drop from trees along the shoreline, but they will eat leaves, flowers, underwater plants, and the tiny plantlike growths called algae (AL-jee). They will also eat hard cones that require a solid bite to break open. They are not strict plant eaters, however. If the turtles find the wormlike young form of an insect, called a “grub”; a beetle; or an ant, they will eat those too. They will even partake of freshwater snails or other mollusks, crustaceans (krus-TAY-shuns) such as shrimp, or even dead mammals or birds.

BEHAVIOR AND REPRODUCTION

Unlike most other water-living turtles, the pig-nose turtle swims by paddling its large front legs, rather than using mainly its hind legs. It uses the hind limbs, which have webbing, to help them paddle and steer. They do not bask, or sun themselves, but they do warm their bodies by swimming to areas of the water with higher temperatures, such as small thermal springs, or hot springs. There, they lie on the river bottom, above the outpouring of hot water, and heat up their “cold-blooded” bodies. Like other animals that are cold-blooded, their body temperatures vary, depending on the outside temperature: In cool water, they are cool; in warm water, they are warm.

These turtles spend much of the day eating. Several of them will sometimes group together and share a good food source when they find one. Otherwise, the turtles spread out, with males and females ranging over a fairly large area: males are known to travel over a 5-mile (8-kilometer) area of river and females over a 2-mile (3.2-kilometer) area.

Males and females come together once a year or possibly once every two years to mate. Scientists know little about their courtship or other mating activities, but the turtles have been seen nesting in the evening and at night toward the end of the dry season, and some females have more than one set of young in a single year. The female makes her nest in a dry spot, often on a high beach. She scrapes out a shallow hole with her



hind legs and drops in seven to thirty-nine round, brittle (BRIH-tuhl), or easily broken, eggs that measure 1.5–2.1 inches (3.8–5.3 centimeters) around and weigh 1.1–1.6 ounces (32–46 grams). The white eggs begin developing into young turtles immediately and are ready to hatch in sixty-four to seventy-four days, but the hatching time can be delayed temporarily until the rainy season starts. Because of this delay, the time from egg laying to hatching can be as little as eighty-six days or as much as 102 days. As with many other turtles, the outside temperature during the time before the eggs hatch can affect the number of male and female hatchlings. In this species, a warm spell about halfway through incubation produces females, and a cool spell produces males.

PIG-NOSE TURTLES AND PEOPLE

Pig-nose turtle eggs often fall victim to local people in New Guinea, who find the turtle's beach nests and collect the eggs

for food. In both New Guinea and Australia, local people trap, net, spear, fish, and simply collect the turtles by hand for their meat. The turtle also is popular in the international pet trade, although it is protected in Australia.

CONSERVATION STATUS

Collection of the pig-nose turtle for food and as pets, combined with loss or destruction of their habitat, or preferred living areas, have all threatened this turtle. The World Conservation Union (IUCN) has given its status as Vulnerable, meaning that it faces a high risk of extinction, or dying out, in the wild. Logging and farming can destroy waterside plants and drastically increase erosion (ih-ROH-zhen), or wearing away of the land, both of which can affect the turtles. In addition, the passage of water buffalo on their way to watering holes may also hurt the turtles' chances of survival. The buffalos crush the plants that the turtles eat, and they also trample across the beaches used by the turtles to lay their eggs. Heavy foot traffic can destroy the nests and the eggs inside.

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Pig-nose turtles often swim with just their long snouts sticking out of the water. (Illustration by Barbara Duperron. Reproduced by permission.)

AUSTRALO-AMERICAN SIDE-NECKED TURTLES

Chelidae

Class: Reptilia

Order: Testudines

Family: Chelidae

Number of species: 50 species

family

CHAPTER

phylum

class

subclass

order

monotypic order

suborder

▲ family

PHYSICAL CHARACTERISTICS

Australo-American side-necked turtles are a varied group of medium-sized to rather large turtles with necks that fold sideways under their shells, rather than retracting, or pulling backward, into the shell. In some cases, the neck can be as long as the upper shell, or carapace (KARE-a-pays) or even longer. A few side-necked turtles, however, have very short necks. Depending on the species, the upper shell of adults can range in length from 6 to 19 inches (15–48 centimeters). Most turtles have dark upper shells, and a few have brightly colored lower shells, or plastrons (PLAS-truns); heads; necks; legs; or tails. These parts of the body may be red, orange, or yellow. Often, the juveniles (JOO-vuh-nuhls), or young turtles, are the most brightly colored; the color fades as they age. Some of these turtles have glands, or special organs, that give off a bad smell, which wards off predators, or other animals that hunt and kill the turtles. Males and females look quite similar, although the females in most species are larger than the males. In a few cases, the males have especially long tails that they may use in mating with females.

GEOGRAPHIC RANGE

These turtles range across New Guinea, Australia, Indonesia, and South America.

HABITAT

The Australo-American side-necked turtle typically lives in freshwater lakes, ponds, rivers, and streams that are always filled with water, but they spend part of their time in wetlands

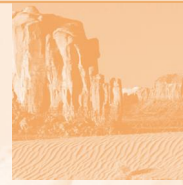
or flooded forests that are wet for just a short period of time each year. Only one species, the New Guinea snake-necked turtle, can be found in estuaries (EHS-chew-air-eez), or that part of a river where it meets the sea, and other areas of partially salty water.

DIET

Most members of this family eat meat or both meat and plants. The adult northern Australian snapping turtle may live only on vegetation, including algae (AL-jee), which are tiny plantlike growths that live in water, and the leaves and fruits of waterside trees they find during the dry season. The meat eaters may feed on worms, insects, fishes, and frogs. Some also eat mollusks, such as clams; crustaceans (krus-TAY-shuns), such as shrimp; or dead animal matter. Many of the mollusk eaters have large, broad jaws that they use to crush their prey's shell. Other species, particularly those that dine on fishes, have long necks that burst through the water when they are going after prey. As the turtle opens its mouth, both water and prey rush in. The turtle then spits out the water and swallows the animal.

BEHAVIOR AND REPRODUCTION

Many Australo-American side-necked turtles feed mainly at night and spend their days basking, or warming themselves, in the sun. When a dry spell strikes, some species bury themselves in the mud and become inactive until the rains come. Steindachner's turtle is one example. This turtle can survive droughts (DROWTS), or dry spells, as long as two years by living off water that it stores inside its body in sacs, or pouches, called "accessory bladders." In cooler climates, some also hibernate, or become inactive, during the winter months. Most hibernate alone, but the common snake-necked turtle of Australia hibernates in groups. Other turtles, like the Argentine side-necked turtle, will take occasional breaks from hibernation (high-bur-NAY-shun) on warm days, when they venture out to a sunny spot and stretch out in the sun.



OUT OF ANTARCTICA?

Australo-American side-necked turtles, both living animals and fossils (FAH-suhls), or remains of animals that lived long ago, are found in Australia and South America, but nowhere else. The large gap in their geographic range makes scientists believe that the South American and Australian species are related through a common ancestor that lived long ago in Earth's history, when the two continents were still linked together by what is now Antarctica. This common ancestor, which spread across Antarctica, could have migrated, or traveled, into the areas that eventually split off to become South America and Australia.

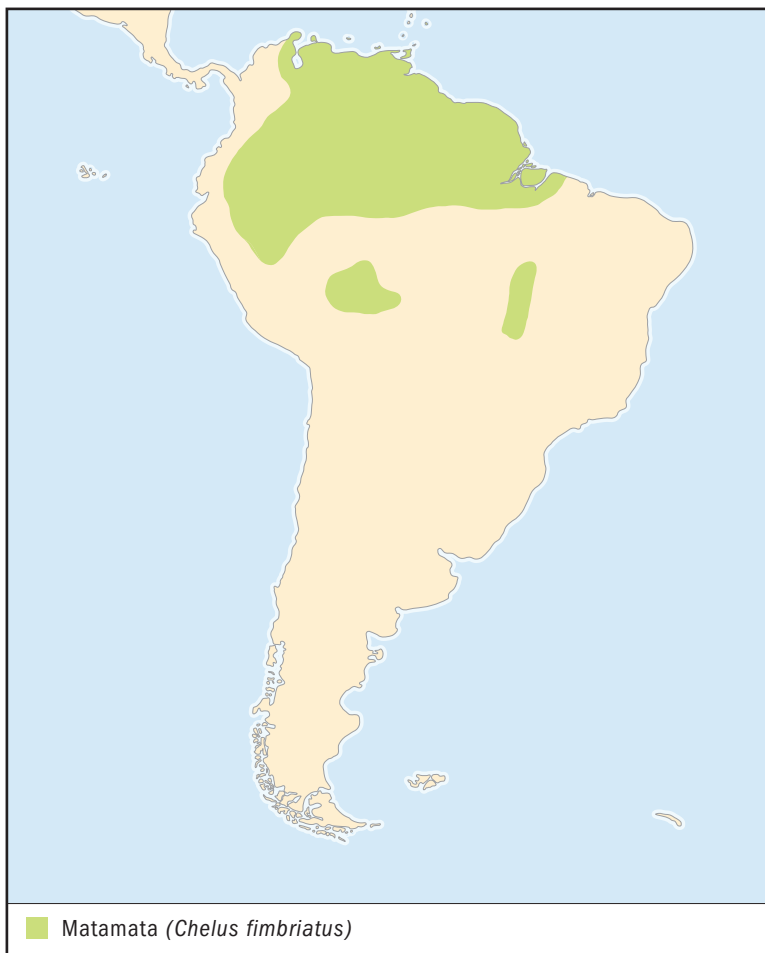
Except for the most tropical of species, which may breed all year, side-necked turtles mate in the early spring. Depending on the species, the female lays one to twenty-eight round or oblong eggs in a shallow depression, or hollow, under leaves; in an underground nook, or sheltered space; or in some other nest. The female of one species, the northern snake-necked turtle, lays her eggs underwater in the muddy bottom of a temporary pond. The eggs develop only after the pond dries up, and the young hatch before the next rainy season arrives. For those eggs laid in underground nests, the young hatch out of the eggs but stay in the nest until the rains come to soften the soil above them. Then they claw their way to the surface and take their first steps aboveground. The outdoor temperature has no effect on whether the eggs hatch into males or females, as it does with many other turtles.

AUSTRALO-AMERICAN SIDE-NECKED TURTLES AND PEOPLE

Some people hunt and kill these turtles for their meat, which they use as food. Although certain species are kept as pets, the pet trade does not harm their survival.

CONSERVATION STATUS

The World Conservation Union (IUCN) lists three species as Critically Endangered, or facing an extremely high risk of extinction, or death, in the wild, and four as Endangered, or facing a very high risk of extinction. Six are Vulnerable, meaning that they face a high risk of extinction, and eight are Near Threatened, meaning that they face the risk of becoming extinct in the near future. One of the Critically Endangered turtles is the western swamp turtle, of which fewer than four hundred individuals survived in 2003, and all live in a few small areas of Brazil. Another turtle, called Hoge's side-necked turtle, is also very rare, existing in just a few spots in the same country. The U.S. Fish and Wildlife Service lists two species as Endangered. The main reason for concern about these species is loss of their habitat, through either damage or complete destruction. Efforts are under way to save these threatened species from extinction by removing them from the wild and breeding them in captivity, possibly for future release back into the wild.



MATAMATA

Chelus fimbriatus

SPECIES ACCOUNT

Physical characteristics: The matamata is one of the larger side-necked turtles as well as one of the biggest freshwater turtles; its dark upper shell can reach up to 18 inches (46 centimeters) in length, and it can grow to a weight of 27 pounds (12 kilograms). It has a flat, lumpy, triangular head, with a rough fringe, or edging. The head sticks out from a flat, knobby shell. Two tiny eyes dot the head. The turtle's upper shell is mostly dark brown. Juveniles have a pinkish-orange lower shell. Often, only the turtle's head is visible in the water, and

Rarely seen, the matamata often travels through the water by walking along the bottom and only occasionally takes an awkward swim. (Gail M. Shumway/Bruce Coleman Inc. Reproduced by permission.)



sometimes just its tube-shaped nose breaks the water's surface as the turtle moves about underwater. Females usually are larger than males.

Geographic range: The matamata lives in northern South America.

Habitat: These turtles prefer still or slow-moving freshwater habitats, or areas in which to live, but some are able to live in saltier waters. Although matamatas sometimes live in swift-moving rivers, they stay out of the current and move beneath underwater banks or logs.

Diet: The matamata is mainly a fish-eating species; it ambushes, or attacks, its prey by settling on the bottom and waiting for a fish to approach. Water currents brush the turtle's head fringes back and forth, and many scientists think that this movement attracts fishes. When the prey is close enough, the turtle darts out its head while enlarging its neck and mouth, and sucks in a great gulp of water along with the prey. The turtle then releases the water from its mouth and

eats the fish. Some turtle experts believe that the skin flaps, or fringes, on the head may also help the turtle sense water movement and know when prey species are swimming through the murky, or dark, water of muddy ponds.

Behavior and reproduction: Rarely seen, this side-necked turtle often travels through the water by walking along the bottom and only occasionally takes an awkward swim. Juveniles are known to bask, but adults do not. Once a year, the females make nests, sometimes in riverbanks, where they lay eight to twenty-eight round eggs that measure 1.4–1.6 inches (3.6–4 centimeters) in diameter, or width. The eggs hatch more than six months later. Little is known about courtship, mating, or other activities of these turtles in the wild.

Matamatas and people: Matamatas are quite popular in the pet trade, probably because of their unusual fringed heads.

Conservation status: This turtle is not threatened. ■

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SEATURTLES

Cheloniidae

Class: Reptilia

Order: Testudines

Family: Cheloniidae

Number of species: 6 species

family

CHAPTER

phylum

class

subclass

order

monotypic order

suborder

▲ family

PHYSICAL CHARACTERISTICS

The seaturtles are large animals that live in the ocean. Their upper shell, or carapace (KARE-a-pays), is quite flat rather than highly rounded. The lower shell, or plastron (PLAS-trun), is a bit smaller than in most turtles and attaches to the upper shell by tough but flexible tissues called ligaments (LIH-guh-ments), rather than the bony bridge common to land turtles. Seaturtles are excellent swimmers, gliding through the water with sweeps of their large, broad, and powerful front limbs, which look like flippers or paddles. Unlike many other turtles, they cannot retract, or pull back, their limbs or heads into their shells. The largest members of the family, the leatherback seaturtles, tip the scales at half a ton (454 kilograms) or more. The leatherbacks have a carapace that measures 6 to 7 feet (1.8–2.1 meters) in length.

GEOGRAPHIC RANGE

Seaturtles inhabit all the oceans of the world and the Mediterranean Sea.

HABITAT

These turtles live in saltwater from the tropics to areas with mild climates well north and south of the equator, the imaginary circle around Earth that is midway between the poles. They are more common close to shore than far out to sea, and they feed and nest at sites along the coastlines on continental shelves, or shallow plains forming the borders of continents.

DIET

Most seaturtles are primarily meat eaters. Their diets are made up of a variety of marine, or sea, animals, including fishes; snails and other mollusks (MAH-lusks), or animals with a soft, unsegmented body covered by a shell; barnacles and other crustaceans (krus-TAY-shuns), or animals with a soft, segmented body covered by a shell; and certain sponges and sea urchins. The green seaturtle is the only member of the family that is known to prefer eating plants. Sea grasses make up the majority of its diet.

BEHAVIOR AND REPRODUCTION

Perhaps the most famous behavior of seaturtles is migration (my-GRAY-shun). An individual seaturtle may travel hundreds of miles to go from its feeding area to its nesting site and back. Usually, the feeding grounds are in temperate waters, which are neither very warm nor very cold; the nesting areas, on the other hand, are in tropical waters, which are very warm. The distance between the two places can result in a trek, or journey, of 190 miles (306 kilometers) or more, one way. When the winter months arrive, many turtles migrate (MY-grayt) to warmer tropical waters, but some drop down to the muddy bottoms of coastal waters and bury themselves there to survive the coldest temperatures.

Female seaturtles typically produce several clutches, or nests, of eggs in a season—sometimes seven or more—but they do so only once every two or three years. Rarely, a seaturtle will nest every year. In some cases, the female turtles will gather offshore in groups. Members of these groups clamber onto shore to make nests near one another. The females of almost all species wait until nightfall to dig their nests and lay their eggs. The round eggs are leathery and range from about 1 to 2 inches (2.5–5 centimeters) in diameter, or width across each egg. A single clutch may contain up to 250 eggs, but 90–130 is more com-



TRAWLING AND TURTLES

Trawling is a type of fishing business that many scientists believe is dangerous to marine life, including seaturtles. In this kind of fishing, a device scrapes the seafloor and collects animals that live on the bottom. For turtles, the danger is not in accidentally collecting them but rather in disturbing them as they move from feeding grounds to nesting sites. One study of olive ridley seaturtles found that trawling delayed the arrival of the female turtles at their nesting sites, and the females laid their eggs later in the year, when temperatures were warmer. The warmer temperature meant that the young ridleys were mostly females. Scientists believe that if this shift in the numbers of males and females continues, it could have an effect on the survival of this endangered species.

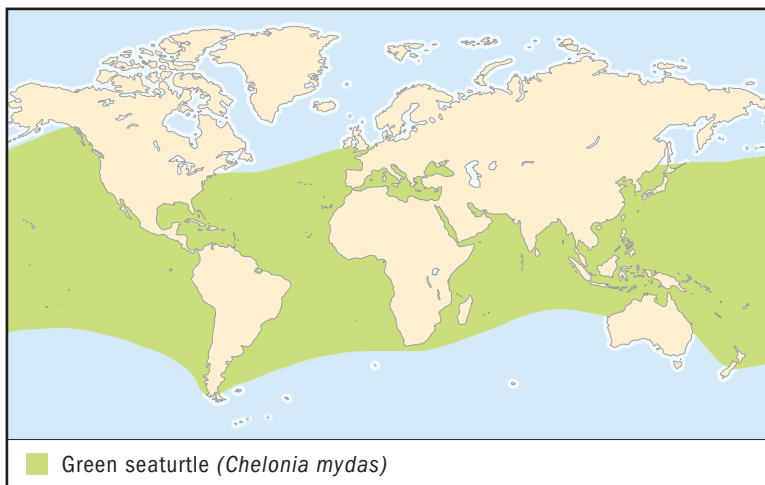
mon. The eggs hatch in forty to seventy days. As with most turtles, the outdoor temperature during their incubation (ing-kyuh-BAY-shun), or the period of time before the eggs hatch, determines whether the egg will become a male or female upon hatching. When the weather is warm, more females hatch; males usually hatch when the weather is cooler.

SEA TURTLES AND PEOPLE

Humans have long sought seaturtles and seaturtle eggs as food. Some people make the eggshells into trinkets. Adult leatherback seaturtles are also prized for their skins.

CONSERVATION STATUS

The World Conservation Union (IUCN) lists the olive ridley, loggerhead, and green seaturtles as Endangered, meaning that they face a very high risk of extinction in the wild in the near future. The hawksbill and Atlantic ridley seaturtles are Critically Endangered, meaning that they face an extremely high risk of extinction in the wild in the near future. Hunting and egg collecting, along with dangers that come from shrimp-ing and fishing practices, are responsible for much of the decline in turtle numbers. The U.S. Fish and Wildlife Service lists the olive ridley seaturtle as Threatened, meaning that it is likely to face the danger of extinction in the near future in the United States. Certain populations of green seaturtle are Endangered, and others are Threatened. The hawksbill and Kemp's ridley are Endangered, and the loggerhead is Threatened.



GREEN SEATURTLE

Chelonia mydas

SPECIES ACCOUNTS

Physical characteristics: The green sea turtle is dark brown to black, with a whitish underside. This turtle gets its name from the color of its body fat, which is green from their diet of algae (AL-jee), or tiny, plantlike growths that live in water. The upper shell of this large turtle can measure 5 feet (1.5 meters) in length, and the turtle itself can weigh as much as 750 pounds (340 kilograms). It has large, flipper-like front legs, with which it swims, and a fairly flat upper shell, to slice more easily through the water. Compared with females, males have a long claw on the front flipper and a lengthier tail and narrower upper shell.

Geographic range: The green sea turtle lives in tropical and temperate seas around the world.

Habitat: Although they sometimes can be found in temperate salt-water areas or far out at sea, green sea turtles are much more common in shallow, sea-grass-covered coastlines and in the warmer waters of the tropics.

Diet: Adult green sea turtles spend much of the daylight hours munching on sea grasses and algae, which are the main items of their diet. Only rarely do they eat a bit of meat, such as a sponge or jellyfish. Some

The upper shell of the green sea turtle can measure 5 feet (1.5 meters) in length, and the turtle itself can weigh as much as 750 pounds (340 kilograms). (©Dr. Paula A. Zahl/Photo Researchers, Inc. Reproduced by permission.)

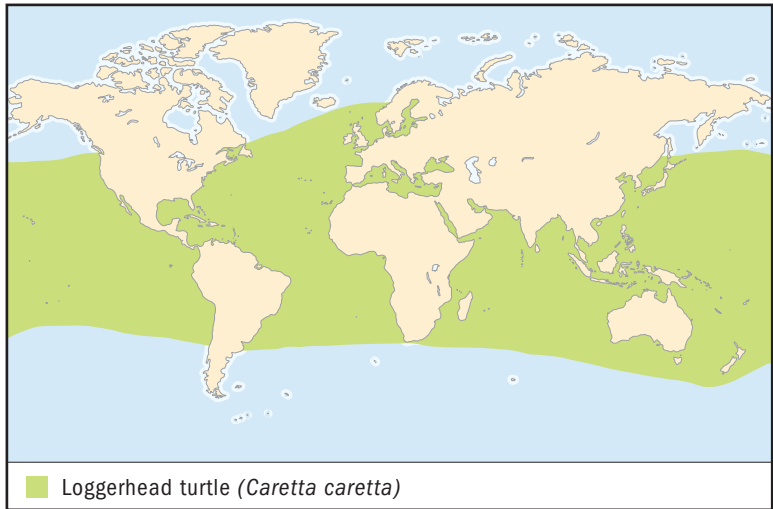


scientists believe that the young may eat much more meat, but there is no evidence that they do.

Behavior and reproduction: As a cold-blooded animal, or one that gets its body warmth from the surrounding environment, the sea turtle does different things to maintain a healthy body temperature, such as rising to the sunshine-drenched top of the water column. Unlike other saltwater-living turtles, this species will even crawl up on the shoreline to bask, or rest, in the sun. When winter cold arrives, some species hibernate (HIGH-bur-nayt), or become inactive, by dropping down to the bottom of the water and burying themselves in the mud. In the breeding season, when they reproduce, males and females may migrate more than 1,900 miles (3,058 kilometers) from their feeding grounds to their nesting sites. There, males try to attract the females by giving them little nips, nudges, and sniffs; the turtles mate in the water. A single female may mate with several males, and so the young in a female's clutch may have different fathers, some from matings that happened several years earlier. When she is ready to lay her eggs, the female will crawl up onto a dry coastline, dig a hole, and drop in fewer than a dozen to nearly 240 eggs, although 108 to 120 per nest is typical. She may lay two to five nests, and sometimes as many as seven, in a single season. The leathery, round eggs hatch in one to three months.

Green sea turtles and people: For centuries, humans have hunted green sea turtles for their meat and their eggs, which they eat for food.

Conservation status: The IUCN lists this species as Endangered. The U.S. Fish and Wildlife Service lists the breeding populations in Florida and the Pacific coast of Mexico as Endangered and all other populations as Threatened. Besides hunting and collecting, these turtles are in danger from the development of their nesting grounds into seafront resorts, from fishing nets that entangle them and often lead to their deaths by drowning, and from boaters who unknowingly run over them with their motor propellers. ■



LOGGERHEAD TURTLE

Caretta caretta

Physical characteristics: The loggerhead turtle has a short head that is wide at the rear and rounded at the front. It is the largest sea turtle, with a carapace up to 7 feet (2.1 meters) long and a weight of half a ton (454 kilograms). It has a hard shell with a keel, or upper ridge, down the middle and large, flipper-like front limbs. The upper shell is reddish brown to greenish, and the lower shell is whitish to yellowish.

Geographic range: The loggerhead lives in tropical and temperate oceans of the world, as well as the Mediterranean Sea.

Habitat: For the breeding season, this saltwater turtle prefers tropical waters in protected areas, such as bays, or parts of the sea that cut into a coastline, and estuaries (EHS-chew-air-eez), or the wide parts at the lower ends of rivers, where the river meets the sea. The turtle travels well into temperate regions during the remainder of the year.

Diet: Meat is the primary food of both young and adult loggerheads. Hatchlings, or newly hatched turtles, will also eat pieces of the algae mats among which they float, and adults will munch on underwater



The loggerhead lives in tropical and temperate oceans of the world, as well as the Mediterranean Sea. (©Michael Patrick O'Neill/Photo Researchers, Inc. Reproduced by permission.)

plants and algae. Favored food items for adults include snails and other mollusks, sponges, squid, and fishes.

Behavior and reproduction: Females sometimes migrate every year, but usually every two to three years, from feeding areas to nesting sites, which may be 1,300 to 1,700 miles (2,092–2,736 kilometers) away. While migrating, the males court the females with little bites, and the two turtles mate while floating in the water. After mating with one or more males, the female arrives at the nesting site, waits until nightfall to crawl onshore, digs a hole, and typically lays 96 to 120 round eggs. She may lay up to seven clutches in a single season. In about two months the eggs hatch. The young from a single female—even young from the same clutch—may have more than one father. The incubation temperature determines the sex of turtles, with higher temperatures producing females and lower temperatures producing males.

Loggerhead turtles and people: Some people still hunt this turtle and collect its eggs for food.

Conservation status: The IUCN lists the loggerhead as Endangered, and the U.S. Fish and Wildlife Service describes them as Threatened. Development of coastal properties seems to be destroying their nesting areas, which has led to their decline. ■

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family CHAPTER

SNAPPING TURTLES

Chelydridae

Class: Reptilia

Order: Testudines

Family: Chelydridae

Number of species: 4 species

PHYSICAL CHARACTERISTICS

Snapping turtles are large, unfriendly turtles that have strong, clawed legs; a powerful bite; and a long neck. With its long neck, the snapping turtle can quickly swing its large head far forward as well as sideways and back over the upper shell. These turtles also have a long, strong tail with a row of ridges. The upper shell, or carapace (KARE-a-pays), has three keels, or ridges, but older turtles usually lose the keels and have smooth shells. The lower shell, or plastron (PLAS-trun), is quite small, which allows the turtle to move its legs easily. The length of an adult's upper shell ranges from 7.1 to 31.5 inches (18 to 80 centimeters), and the lower shell may be only about one-fourth that size. Females weigh about 4.4 to 5.5 pounds (2 to 2.5 kilograms). Males generally are larger than females and can weigh as much as 249 pounds (113 kilograms).

GEOGRAPHIC RANGE

Snapping turtles live in North America, Central America, and South America, from southern Canada to Ecuador.

HABITAT

These turtles mainly live in permanent water bodies, ones that are filled with water all year long. Some are able to survive in somewhat salty waters, but they typically prefer freshwater. Although they spend the majority of their time in the water, they will travel quite a distance over land to nest, and one species makes overland trips from one watering hole to another.

phylum

class

subclass

order

monotypic order

suborder

▲ **family**



THE LURE OF THE TURTLE

Besides being the biggest member of the snapping turtle family, the alligator snapping turtle has another interesting feature. It uses a bit of flesh on its tongue to draw in hungry fishes. This “lure” not only looks like a pink worm but also wiggles like a worm. When a fish approaches to nab an easy lunch, the turtle quickly lashes out and clamps its strong jaws around the unsuspecting fish. Besides fishes, this turtle’s diet includes snails, clams, plant roots, other turtles, birds, and even small alligators.

DIET

Snapping turtles are primarily meat eaters, dining on almost anything they can find, whether it is alive or dead. The diet includes worms, insects, snails, and larger items, such as other turtles, ducklings, and small mammals. Although it is not common, some turtles can live on an all-plant diet.

BEHAVIOR AND REPRODUCTION

Most people know snapping turtles for their unfriendly personality. The turtles can quickly strike out with their long necks and powerful jaws and snap at any passing animals, whether it is a fish or other prey they want to eat or a person who comes too close. Instead of teeth, they have a hook at the front of the upper jaw that helps in grasping and then tearing apart prey. Snapping turtles occasionally sunbathe, or “bask,” on land, but more typically they float just below the water’s surface and soak up the

warmth there. Snapping turtles that live in warmer climates are active day and night all year long, but those that live in cooler areas usually are active only during the day and typically spend the cold winter months buried in the muddy bottom of a waterhole.

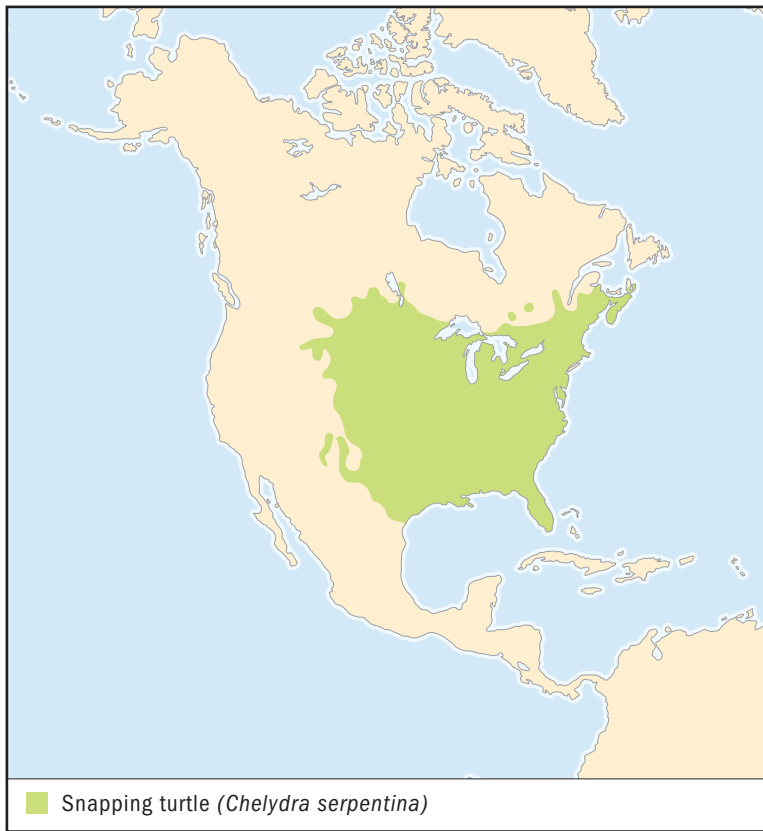
During the breeding season, the female digs a hole on land, sometimes near the water and at other times quite far away, in dry areas. There, she lays up to 109 round eggs and buries them. Snapping turtles provide no care for the eggs or the young that hatch from the eggs. The outdoor temperature controls the number of males and females in each batch of eggs.

SNAPPING TURTLES AND PEOPLE

Although snapping turtles are not especially friendly, they are of little threat to humans who do not bother them. Humans hunt the turtles for food and occasionally for the pet trade.

CONSERVATION STATUS

The World Conservation Union (IUCN) lists the alligator snapping turtle as Vulnerable, which means that there is a high threat of their extinction: they could die out entirely. There are many sources for these threats, including too much hunting of them and the loss of good habitat.



SNAPPING TURTLE

Chelydra serpentina

SPECIES ACCOUNT

Physical characteristics: The snapping turtle, or snapper, is a fairly large member of this family. The upper shell is up to 19.3 inches (49 centimeters) in length. The shell is dark, usually black to greenish-brown, and frequently covered with green, slimy algae (AL-jee), or plantlike growths. The upper shell and the long tail have a series of ridges. The shell ridges become less and less noticeable as the animal ages. Snapping turtles have large heads with a hook on the upper jaw.

Geographic range: Snapping turtles live in North America, Central America, and South America, from southern Canada to Ecuador.



During the breeding season, the female snapping turtle digs a hole on land. There, she lays up to 109 round eggs and buries them. The outdoor temperature controls the number of males and females in each batch of eggs. (E. R. Degginger/Bruce Coleman, Inc. Reproduced by permission.)

Habitat: These turtles typically live in plant-filled, shallow, calm waters with mucky bottoms. Most make their homes in freshwater areas, but some live quite well in somewhat salty waters.

Diet: Like most members of this family, the snapping turtle eats mostly meat. It is not a picky eater. Snapping turtles will eat earthworms and leeches; clams; insects and spiders; frog eggs, tadpoles, and adult frogs; reptiles, including other turtles; ducklings and other small birds; small mammals; and almost any dead animal they come across. Plants are not uncommon, and some populations of turtles even live by eating only plants.

Behavior and reproduction: Despite its usually slow walking speed on land, this turtle is amazingly

swift when it comes to striking out with its powerful jaws to grab a passing animal as a meal or to defend itself against a large attacking animal or a person who is just a bit too curious. With its long neck, this turtle can swing its head forward, sideways, and backward almost half as far as it is long, and its powerful jaws can deliver a nasty bite to a person's hand or fingers.

For the most part, the snapping turtle stays in the water, where it spends most of its time sunbathing or hunting for food. To sunbathe, or "bask," the turtles float in warm water near or at the surface. Rarely, a snapper will bask on shore on a log or rock. They often hunt by hiding in the muddy bottom to wait for a tasty treat, like a fish or tadpole, to swim by. They also hunt by slowly walking along the water bottom and looking for their next meal. Turtles living in warmer climates are active day and night and all year long. Those living in cooler, northern areas are mostly active early and late in the day and spend the colder months buried underwater in the mucky bottom.

Mating season runs from spring to fall. Some males may sway their heads in front of females to attract them, but usually the males skip courtship altogether. Females lay one batch of eggs a year. Sometimes they make their nests, which are just holes they dig in the ground, close to the water, but they also may travel great distances, in some cases nearly 10 miles (16 kilometers). Females can lay six to 109 round, white eggs; they typically lay about thirty-two eggs per nest. The eggs hatch in about seventy-five to ninety-five days, but sometimes they hatch in as little as two months or as much as six months.

Nest temperature controls the sex of the newly hatched young turtles. High and low temperatures produce females, and moderate temperatures produce males. Because a female can lay so many eggs at a time and the nest is so large, some parts of the nest may be warmer or cooler than others. This often means that females will hatch from one part of the nest and males from another.

Snapping turtles and people: Humans hunt snapping turtles for their meat. Many turtles also die each year from being hit by cars as they cross roads to move from a water hole to a nesting site and back.

Conservation status: These turtles are not threatened, although many snapping turtle eggs are destroyed each year when raccoons and other mammals dig up the freshly laid nests and eat the eggs. ■

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family CHAPTER

CENTRAL AMERICAN RIVER TURTLE *Dermatemyidae*

Class: Reptilia

Order: Testudines

Family: Dermatemyidae

One species: Central American
river turtle
(*Dermatemys mawii*)

PHYSICAL CHARACTERISTICS

The only living Central American river turtle, which has the scientific name *Dermatemys mawii*, is a large animal with a small head and a pointy snout. It has a dark-colored, somewhat flat upper shell, or carapace (KARE-a-pays). The carapace of adults is thick, heavy, and smooth. It is so smooth that it almost looks like it is made of leather. The yellow- or cream-colored lower shell, or plastron (PLAS-trun), is large, as is the bony bridge that connects the upper and lower shells. The feet are webbed. Females and males look similar, but females are generally larger. In addition, the upper surface of a male's head has a large yellowish gold patch, while females as well as juveniles (JOO-vuh-nuhl), or the young, have gray on the top of the head. The biggest Central American river turtles can weigh as much as 49 pounds (22 kilograms) and have a carapace as long as 26 inches (66 centimeters).

GEOGRAPHIC RANGE

Central American river turtles live in Mexico, Guatemala, and Belize.

HABITAT

Although some of them may wander into somewhat salty water, Central American river turtles live mainly in freshwater, such as rivers and large lakes. The turtles live in the lowlands of southern Mexico near the Gulf of Mexico. They also live in Belize and northern Guatemala, and possibly in Honduras.

phylum

class

subclass

order

monotypic order

suborder

▲ **family**



THE TURTLE OF MANY NAMES

Besides Central American river turtle, this animal has other common names, including hickety in Belize; jicotea, tortuga plana, and tortuga aplanada in Mexico; and tortuga blanca in Mexico and Guatemala. The word “blanca” means “white” in Spanish and refers either to the white underside of the turtle or to the color of its meat. Some people refer to this turtle as the Mesoamerican (MEH-soh-American) river turtle. Mesoamerican is the word used to describe the culture of Mexico and northern Central America before the Spanish explorers arrived.

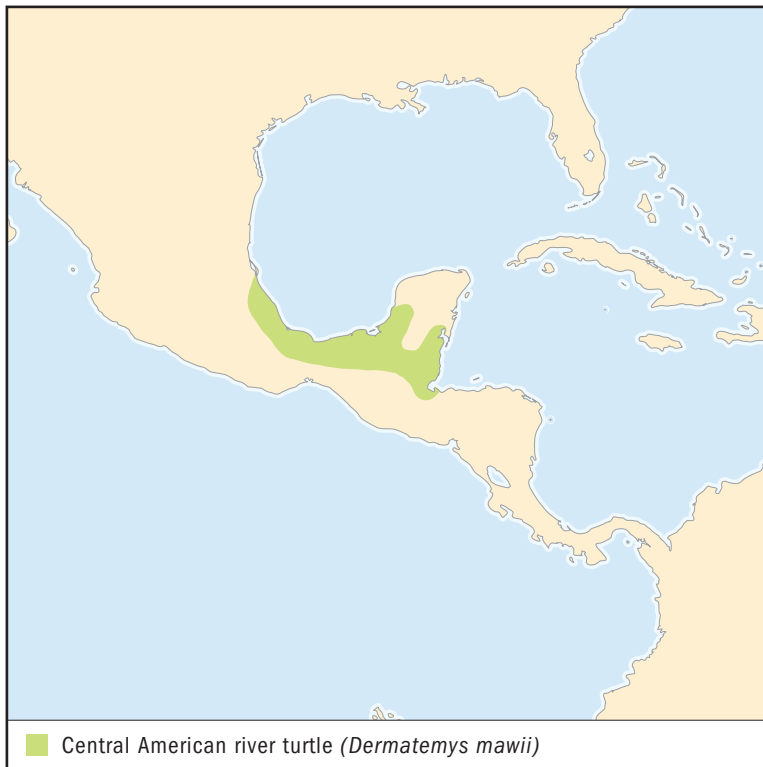
DIET

Central American river turtles eat mostly plants. They prefer figs and other fruits as well as leaves that fall into the water from the trees lining the shoreline. They also eat plants that grow in the water and sometimes an insect, fish, or mollusk (MAH-lusk). Mollusks are soft-bodied animals covered by a shell, such as snails and clams.

BEHAVIOR AND REPRODUCTION

Central American river turtles spend most of their lives in the water. Turtles have lungs and breathe air, but the Central American river turtle is able to stay underwater for long periods of time. In the rare instances when the turtles do leave the water, they are very slow, awkward walkers. They sometimes float in the surface waters on sunny days to soak up some heat, but they do not leave the water, as many other turtles do, to sunbathe, or bask. Besides floating near the surface on warm days, the turtles do little during the day. They become active at night, when they do most of their feeding.

Central American river turtles mate anytime from March to September. For the most part, the only time the turtles leave the water is during the nesting season, which starts in September, when the rainy season is in full force. The turtles nest any time from September to December, but some females start as early as late August or wait until March or April. When she is ready to lay her eggs, the female walks a few feet onto the shore, usually no more than 10 feet (3 meters), and digs a hole. She lays two to twenty brittle-shelled eggs that are about 2.1–2.8 inches (53–71 millimeters) long and 1.2–2 inches (30–51 millimeters) wide and weigh about 1.2–2.5 ounces (34–71 grams) each. A typical nest has eight to fourteen eggs. The female buries the eggs under mud and bits of rotting, nearby plants. The mother turtles usually produce two nests a year, but some have only one nest, and others may make three or four nests each season. Usually the largest females lay the most eggs in a year, and the smallest females lay the fewest. Because female Central American river turtles lay their eggs so close to the water,



during the rainy season the lake or river can overflow onto the shore and flood the nests. The good news is that the eggs can survive being underwater for up to one month. The eggs need about seven to ten months to hatch, and most hatch anytime from late May to July, just when the rainy season starts up. As happens with many other kinds of turtles, warmer nest temperatures turn most Central American river turtle eggs into female hatchlings, or newly hatched young, and cooler temperatures produce males. The warm or cool weather has to occur when the eggs are about halfway along in their development.

CENTRAL AMERICAN RIVER TURTLES AND PEOPLE

Many local people in southern Mexico, northern Guatemala, and Belize consider the meat of Central American river turtle a delicacy and also collect the eggs. Even though these turtles are protected in some areas, hunting continues and threatens the survival of the species.

The Central American river turtle usually remains in the water because it is a slow, awkward walker. (©Jean-Gerard Sidaner/Photo Researchers, Inc. Reproduced by permission.)



CONSERVATION STATUS

Both the World Conservation Union (IUCN) and the U.S. Fish and Wildlife Service label the Central American river turtle as Endangered, or facing a very high risk of extinction in the wild or throughout all or a significant portion of its range. Some governments have protected these turtles, which makes hunting or collecting them illegal.

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LEATHERBACK SEATURTLE

Dermochelyidae

Class: Reptilia

Order: Testudines

Family: Dermochelyidae

One species: Leatherback sea turtle (*Dermochelys coriacea*)

family

CHAPTER

phylum

class

subclass

order

monotypic order

suborder

▲ family

PHYSICAL CHARACTERISTICS

The leatherback seaturtle, which is the only member of its family, is extremely large. The carapace (KARE-a-pays), or upper shell, measures up to 8 feet (2.4 meters) long, and the turtle itself weighs just under a ton, at 1,911 pounds (867 kilograms). Most seaturtles have a hard and bony upper shell, but this turtle's carapace has a smooth, leathery skin. It also has an unusual outline. The upper shell is wide at the front but then narrows to a point at the back, giving it a teardrop shape. In addition, seven very noticeable ridges run from the front of the carapace to the back. This shell is usually black with a few white or yellow spots—almost as if someone had shaken a paintbrush over the back of the turtle. The plastron (PLAS-trun), or bottom shell, has coloring that is the opposite of the carapace coloring. Instead of black with light spots, it is white with dark spots. Leatherback turtles also have large front legs, which do not have separate toes and claws but instead look like paddles or fins.

GEOGRAPHIC RANGE

This species lives in oceans around the world.

HABITAT

The leatherback seaturtle is found over more of the world than perhaps any other species of reptile. It can live quite well in the warm ocean waters of the tropics and in cooler ocean waters as far north of the equator as Alaska and Iceland and as far south as New Zealand and the Cape of Good Hope at the

southern tip of Africa. It rarely comes into shallow, shoreline waters, staying instead in deeper water for most of its life.

DIET

The diet of the leatherback seaturtle is mostly jellyfish. It also eats many other ocean-living animals, including snails, octopuses, squids, crabs, small fishes, and hydrozoans (hy-druh-ZOH-uhns). Hydrozoans and jellyfish are both sea-dwelling animals without a backbone that have tentacles (TEN-tih-kuhls), or long, thin body parts used for feeling or for holding on to things. These two types of animals look somewhat alike. Seaturtles sometimes think that floating balloons and plastic bags look much like these creatures too, and they eat them by mistake. This can kill the turtle. The turtles also eat plants, such as sea grasses and kelp, which is a type of seaweed.

BEHAVIOR AND REPRODUCTION

Like other turtles, the leatherback seaturtle is cold-blooded, meaning that its body temperature gets cooler when the outside temperature drops and warmer when the outside temperature rises. In most turtles, body temperature very closely matches the outdoor temperature. The seaturtles are a little different. Because they are so large and their muscles heat up when they swim, they can stay warm much longer than a smaller turtle can. They also have oily skin that acts like a jacket, to help keep the body warm. For these reasons, they are able to travel to much colder waters, like those off Alaska or Iceland. These turtles take advantage of this ability to travel to warm and cold waters. They often swim very long distances in what are called migrations (my-GRAY-shuns), moving from one region or climate to another to find food and to lay their eggs. Scientists have tracked some turtles that have swum as far as 3,100 miles (4,989 kilometers) one way to go from a nesting site to a feeding site. On average, these turtles swim about 19 miles (30.5 kilometers) a day for weeks at a time.



SAVING LEATHERBACKS

Leatherback seaturtles have survived on Earth for at least 100 million years. They have even outlasted the great dinosaurs, yet they are now facing extinction. The number of female leatherbacks worldwide dropped from 115,000 in 1982 to fewer than 25,000 two decades later, and the turtles living in the Pacific Ocean suffered the biggest decline in numbers. Many conservation groups, as well as country governments, are worried about the future of this turtle and are trying to do away with hunting and egg collecting. They are also preserving their nesting beaches and protecting adult turtles from fishing and other activities at sea that accidentally harm the turtles.

Many leatherback sea turtles may join together at a particularly good feeding site, like a school, or group, of jellyfish. They also hunt for food alone. Sea turtles are excellent divers, and they can swim down to more than 3,300 feet (1,006 meters) to find deep-water animals to eat. Turtles do most of their diving at night, but they are active both day and night.

Scientists know very little about courtship or mating in leatherback turtles. The turtles may mate before or during the long migration from a feeding area to a nesting area or just offshore from the nesting site. Females make their nests about once every three or four years on tropical beaches. Those that live in the Atlantic Ocean nest from April to November. Pacific Ocean leatherbacks nest at different times of the year, depending on the beach they choose. A small group of females usually nests together on one beach.

The females climb up onto shore, usually at night, and find a spot on dry land. They typically pick a nesting site that is just beyond the highest point that water reaches. Like the upper shell, the lower shell of leatherbacks is softer than that of most turtles, so the females choose sandy rather than rocky beaches to crawl over and dig their nests. They use both their front and back legs to dig a wide hole that can fit the entire body. Then they continue to dig a smaller, deeper pit with just the rear legs. Each female lays 47 to 263 eggs in the pit. Only some of the eggs hatch. From the time she lays them, 1 to 103 eggs have no yolks and so cannot develop into turtles. The rest are normal eggs. Eggs are round and range in diameter, or width, from 1.9 to 2.6 inches (4.8 to 6.6 centimeters) in diameter. Each egg weighs 2.5 to 3.2 ounces (71 to 91 grams).

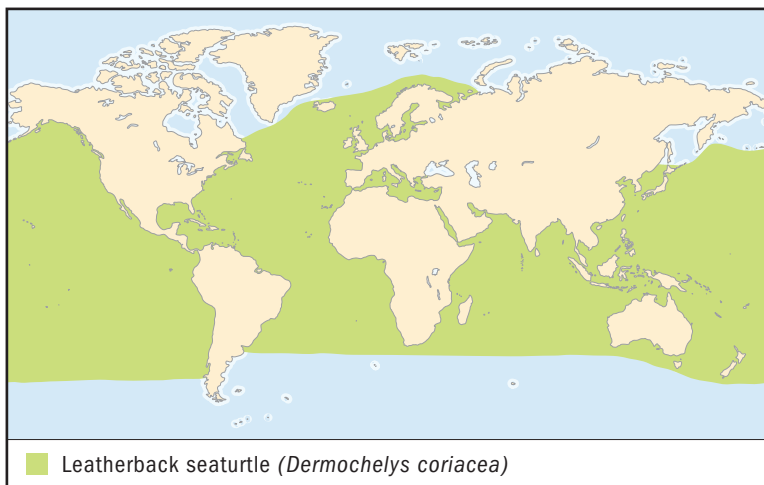
Usually, the biggest females lay the most eggs and the largest eggs. In addition, turtles of the Atlantic typically lay more eggs than those of the Pacific, and nests made during the middle of the nesting season often contain more eggs than nests made earlier or later. Females may make up to eleven nests a year, although five or six is more common. Once she lays the eggs, the female uses her hind legs to cover them with sand and then continues with her front and rear legs to bury the larger body hole. She then leaves the area and provides no care for the eggs or the newly hatched young.

The eggs hatch in sixty to sixty-eight days, although some may hatch in as little as fifty days or as much as seventy-eight



A newly hatched leatherback sea turtle makes its way into the ocean. (AP/Wide World Photos. Reproduced by permission.)

days. If the beach, and therefore the nest, is especially warm about halfway through the eggs' development, most of the eggs hatch into females. If the nest is particularly cool, most of the eggs will hatch into males. The hatchlings wait until nightfall to climb out of the nest and onto the surface of the beach. They then head to the area that is most open to the sky and is the most brightly lit—usually the ocean. The young turtles continue to grow at sea, and when they reach the age of thirteen to fourteen years, they are ready to become parents themselves.



LEATHERBACK SEATURTLES AND PEOPLE

Because this turtle is found in so many areas of the world, it has many names. In Trinidad, for example, people call it caldon, while in the Caribbean and Latin America the turtle is known as canal. This familiarity can pose a problem, however. Although it is illegal in most countries, some people continue to raid the turtles' nests for their eggs or hunt them for their meat or the oil in their shells.

CONSERVATION STATUS

According to the World Conservation Union (IUCN), this species is Critically Endangered, which means it faces an extremely high risk of extinction in the wild. The U.S. Fish and Wildlife Service lists the leatherback turtle as Endangered, meaning that the turtle is in danger of extinction through all or most of its range, or the region over which it roams and feeds. The number of leatherback turtles has dropped rapidly over a very short time, mostly due to hunting of adults and gathering of their eggs. Development of tropical beaches for homes and resorts is also making it more and more difficult for the turtles to find a safe nesting spot. Many countries are now making it illegal to kill adult turtles or take their eggs or else protecting the beaches where they lay their eggs.

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NEW WORLD POND TURTLES

Emydidae

Class: Reptilia

Order: Testudines

Family: Emydidae

Number of species: 35 species

family

CHAPTER

phylum

class

subclass

order

monotypic order

suborder

▲ family

PHYSICAL CHARACTERISTICS

The New World pond turtles come in many shapes and sizes. Adult small bog turtles have upper shells, or carapaces (KARE-a-pays), that grow to about 5 inches (12.7 centimeters) in length, while the carapaces of the large Gray's sliders can reach a length of 2 feet (61 centimeters) or more. Most pond turtles have at least a little webbing between their toes. The males and females look very much alike, though sometimes the females are larger. In some species, the male is more colorful and has long, thin front claws.

GEOGRAPHIC RANGE

Members of this family live in North and South America, Europe, western Asia, and northern Africa.

HABITAT

New World pond turtles may live in tropical areas, where it feels like summer all year, or in cooler areas that have all four seasons, including winter. These cooler areas are known as "temperate climates." Many turtles spend almost their entire lives in or near ponds, lakes, and other freshwater areas, though some can live quite well in saltier waters. Other species live their lives mainly on land.

DIET

Depending on the species, New World pond turtles may eat meat, plants, or a combination of meat and plants. Sometimes,

baby turtles begin their lives as meat eaters but start to munch plants as they grow older. The meat eaters may dine on such animals as fishes, tadpoles, insects, worms, and slugs. Turtles that eat plants prefer grasses, flowers, and berries. They also eat algae (AL-jee), or tiny plantlike growths that live in water.

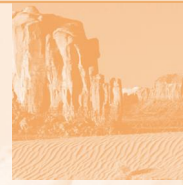
BEHAVIOR AND REPRODUCTION

Many people have seen these turtles, because most of the animals in this family like to sunbathe, or “bask.” Turtles that live in the water typically climb up onto a rock or log sticking up above the water’s surface and soak in the sunshine. Often, many turtles will climb onto the same rock or log and may stack up on one another. Turtles that live on land simply find a sunny spot and bask there. Many of these turtles are active all year, but those that live in temperate climates sink underwater and bury themselves in the muddy bottom or bury themselves in shallow holes or under piles of leaves to wait out the winter. Some that live in areas with long, dry spells also become inactive until the rains come again.

During breeding season, usually in the spring, the males try to attract the females by bobbing their heads or waving their front claws in front of a female’s face. After mating, the female finds a dry spot onshore, sometimes up to 0.6 miles (1 kilometer) away from the water, and digs a hole. She lays as few as one egg and as many as two dozen eggs in the hole and then covers them up. Afterward, she provides no care for the eggs or the young. As with most turtles, the temperature of the nest controls whether the egg becomes a male or a female turtle. Warm nest temperatures produce females, and cool temperatures produce males. The eggs hatch in about two to three months.

NEW WORLD POND TURTLES AND PEOPLE

People enjoy seeing turtles in the wild, but the numbers of many New World pond turtles are dropping. People once collected and killed these turtles to eat their meat. While that practice is not as common anymore, turtles still face threats from



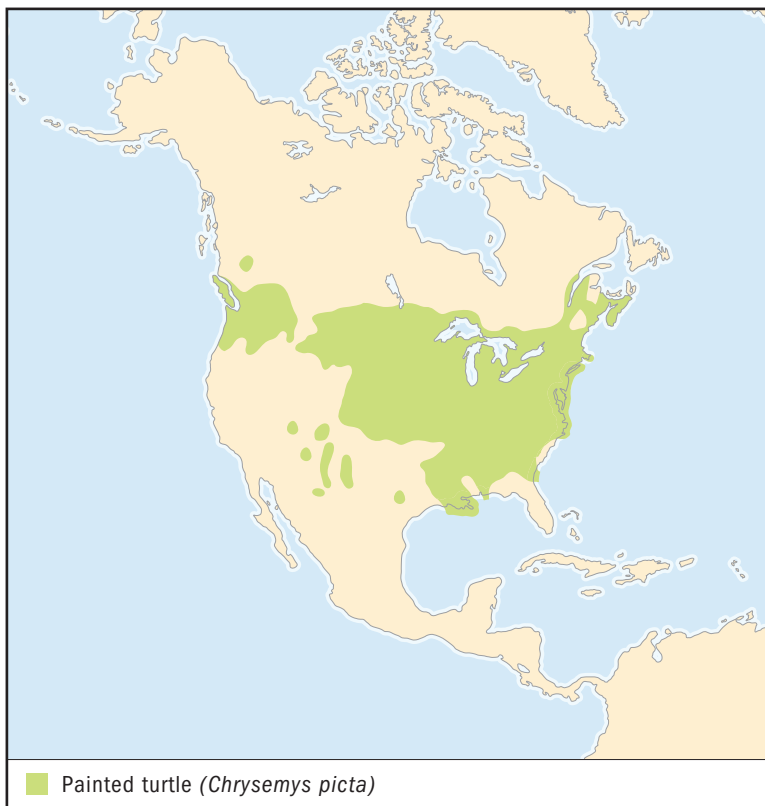
COUNT THE RINGS

In many turtles, including some New World pond turtles, a person can tell how old a turtle is by counting its rings. The rings are on the upper shell, which is split into little sections, called scutes (SCOOTs). Wood turtles, for example, have five scutes down the middle of the shell and another four on each side. Every year the turtle gets a new set of scutes, which grow underneath the old ones; they stack up in a pyramid shape, with older and slightly smaller scutes on top. By counting all of the scutes in one pile, a person can guess the age of the turtle. Sometimes the oldest scutes wear away, so the turtles may actually be a little older than their scutes reveal.

too much collecting for the pet trade or from car traffic on roads they cross to reach a pond, nesting site, or other area.

CONSERVATION STATUS

According to the World Conservation Union (IUCN), six New World pond turtles are Endangered, meaning that they face a very high risk of extinction in the wild. Seven species are Vulnerable, meaning that there is a high risk that they will become extinct in the wild, and fourteen are Near Threatened, meaning that they are at risk of becoming threatened with extinction in the future. The U.S. Fish and Wildlife Service lists the Alabama red-bellied turtle as Endangered and three other species as Threatened. Pollution, collection for the pet trade, and destruction of habitat, or the areas in which the turtles prefer to live, are major reasons that the numbers of these turtles are low. In addition, raccoons and other animals often dig up nests and eat the turtle eggs.

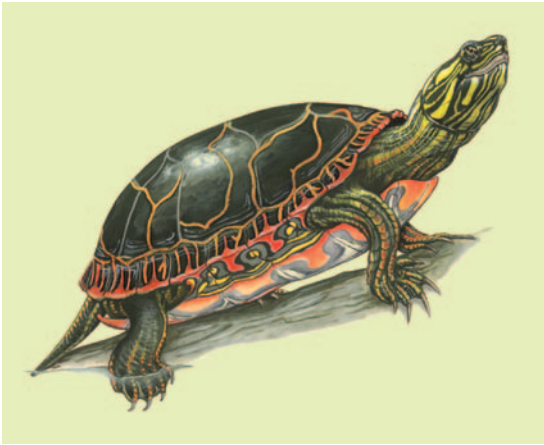


PAINTED TURTLE *Chrysemys picta*

SPECIES ACCOUNTS

Physical characteristics: The painted turtle is a medium-sized turtle that is mostly olive or black on the legs, head, neck, and upper shell. Adults can grow to 3.5–10 inches (9–26 centimeters). The head has yellow stripes, and there are both red and yellow stripes on the neck and legs and red striping around the edge of the upper shell, the carapace. The bottom shell, or plastron (PLAS-trun), is yellow or tan, with a long, dark blotch running down the middle. Males and females look very much alike, except that the females are larger and the males have longer and thinner front claws. A large female's carapace can reach almost 10 inches (26 centimeters) in length.

Geographic range: These turtles are found in Canada and the United States.



Painted turtles are mainly freshwater animals, although a few live in saltier waters. They prefer waters with little, if any current. (Illustration by Gillian Harris. Reproduced by permission.)

Habitat: Painted turtles are mainly freshwater animals, although a few live in saltier waters. They prefer waters with little, if any current, or swift-moving water. They live in southern Canada and mostly in the far northern, central, and eastern United States, though a few populations live in the southwestern United States and just over the border in Mexico.

Diet: Painted turtles are not picky eaters. Their meals consist of plants, insects, snails, leeches, tadpoles, and small fishes that they find in the water. They will also eat dead animals. Young turtles are mainly meat eaters and then switch to eating more and more plants as they grow older.

Behavior and reproduction: The painted turtle spends much time sunbathing, or “basking,” on logs or rocks that poke up out of the water. During the winter months, which can become quite cold in the northern part of their range (the region where they roam and feed), they bury themselves underwater in the muddy bottom and wait for spring. If the winter day is warm enough, they may crawl through a hole in the ice and bask before returning underwater. Males and females mate in the fall or in the spring. The male attracts the female by tickling the sides of her head with his long claws. The females leave the water from late spring to midsummer to nest on land, usually somewhat near the water. The nest is a hole she digs in the ground. She lays one to twenty eggs in each nest and typically makes one or two nests a year. Nest temperature controls the number of males and females in the clutch. The eggs hatch in seventy-two to eighty days.

Painted turtles and people: Most people know these turtles as the ones they see basking on logs in lakes and rivers. Some people collect the turtles for the pet trade, and a few eat their meat.

Conservation status: Painted turtles are not threatened, but many of them are killed every year by raccoons and other animals that dig up their nests and eat the eggs or by cars that run over the turtles as they attempt to cross roads. ■



EASTERN BOX TURTLE

Terrapene carolina

Physical characteristics: The eastern box turtle is a small- to medium-sized turtle with a rounded upper shell. The adult's lower shell has two hinges. When the turtle is frightened, it can pull its head, legs, and tail into the shell and use the hinges to close up the lower shell. The carapace is black with a pattern of short yellow stripes. Males have red eyes, a longer and thicker tail than that of the females, and a lower shell that is indented rather than flat. Females are larger than males and have carapaces that can reach 9 inches (23 centimeters) in length.

Geographic range: These turtles live in the United States and Mexico.

Eastern box turtles live on land, so they cannot swim away from danger, and they are not fast runners. To protect themselves against predators the adults tuck their legs, tails, and heads inside their shells and use the hinges in the upper shells to close up tight. (Illustration by Gillian Harris. Reproduced by permission.)



Habitat: This species lives in much of the eastern half of the United States and parts of Mexico near the Gulf of Mexico. It is a land turtle that roams forests and fields.

Diet: Eastern box turtles eat a variety of plants and animals, including grasses, flowers, and berries as well as insects and earthworms.

Behavior and reproduction: These turtles live on land, so they cannot swim away from danger, and they are not fast runners. To protect themselves against predators (PREH-duh-ters), or animals that might want to eat them, the adults tuck their legs, tails, and heads inside their shells and use the hinges in the upper shells to close up tight. Predators cannot get through the sealed shell. Young turtles, however, do not have hinges. Instead, they release a strong odor that persuades predators to leave them alone. Like other members of this family, eastern box turtles sunbathe to warm up. When the day gets too hot, they hide just barely underground. In the winter months these turtles bury themselves beneath a pile of leaves or just under the soil and wait until spring. Sometimes, if the winter becomes particularly cold for a few days, a turtle will freeze, and its heart will stop beating, but they do not die.

Males and females mate in the spring. The male attracts the female by biting at her shell and sometimes her head and bumping into her. Females lay their eggs from spring to midsummer, sometimes making five nests a year, though most of them make just one or two. The

female lays one to eleven eggs in each nest, and the eggs hatch in about two and a half months. The nest temperature controls the number of males and females in each nest. A warmer nest produces all females, and a cooler nest produces all males.

Eastern box turtles and people: This turtle is popular in the pet trade because of its size and friendly behavior. People rarely see them live in the wild, except when the turtles attempt to cross a road—an activity that too often results in death from a passing car.

Conservation status: According to the IUCN the eastern box turtle is Near Threatened, meaning that it is at risk of becoming threatened with extinction in the future. Habitat loss has caused some of the drop in turtle numbers. ■

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**EURASIAN POND AND RIVER
TURTLES AND NEOTROPICAL
WOOD TURTLES**

Geoemydidae

Class: Reptilia

Order: Testudines

Family: Geoemydidae

Number of species: 62 species

family

CHAPTER

phylum

class

subclass

order

monotypic order

suborder

▲ **family**

PHYSICAL CHARACTERISTICS

Eurasian pond and river turtles and neotropical wood turtles are small to large turtles. The upper shell, or carapace (KARE-a-pays), is bony. Most of these turtles have webbing between their toes. Some of them have a side-to-side hinge in the bottom shell, or plastron (PLAS-trun), which allows them to close up tight if they feel threatened. In some species, the males and females look quite different from each other. The male Indian tent turtle, for example, grows to only about a third of the size of the female, which is typically 1 foot (30.5 centimeters) long. The largest members of this family weigh 110 pounds (50 kilograms) and have upper shells that can reach 32 inches (81 centimeters) in length.

GEOGRAPHIC RANGE

These turtles live in Eurasia, North Africa, Mexico, and Central and South America.

HABITAT

The members of this family live in the saltwater of the ocean's coastline, in inland freshwater areas, or on land in forests. They typically are found in the tropical areas of many countries, including China and the nations of the East Indies and Europe. They live from northern Mexico in North America to Ecuador and Brazil in South America. They also live in regions bordering the tropics, which are called "subtropical" regions.

DIET

Some Eurasian pond and river turtles and neotropical wood turtles eat only meat, and some eat only plants; others will dine on both meat and plants. In one species, called the Chinese stripe-necked turtle, the juveniles (JOO-vuh-nuhls), or young turtles, and the males eat mainly meat in the form of insects, but the females are primarily vegetarians and eat mostly leaves, seeds, and roots from the shoreline plants.

BEHAVIOR AND REPRODUCTION

Just as the habitat, or the natural living area, differs from species to species in this family, so, too, does their behavior and method of reproduction. Some of them hardly ever leave the water, but others live on land. Many of them are active all year long, but others become inactive during the winter months or during dry spells. Some, such as the Chinese stripe-necked turtle, sunbathe, or “bask,” onshore to warm their bodies.

Although scientists know few details about many of these turtles, they have noted that the adult male of some species will bite or bump up against a female to persuade her to mate. Also, the heads and legs of a few species will become more brightly colored during mating season, probably to attract a mate. Male painted terrapins, for example, normally have gray heads, but their heads become white with a red stripe during mating season.

Females of the larger species lay the most eggs—up to thirty-five eggs at a time. The smallest species may lay just a single egg. Female painted terrapins travel as far as 31 miles (50 kilometers) to reach a good nesting site and then lay their eggs at night. They lay eggs about five times a year. In many cases, the temperature of the nest does not affect the sex of the newly hatched young turtles. In other species, however, a particularly warm nest temperature produces all females, and a cool one produces males. In at least one species, the eggs may also become females if the nest temperature is especially cold.

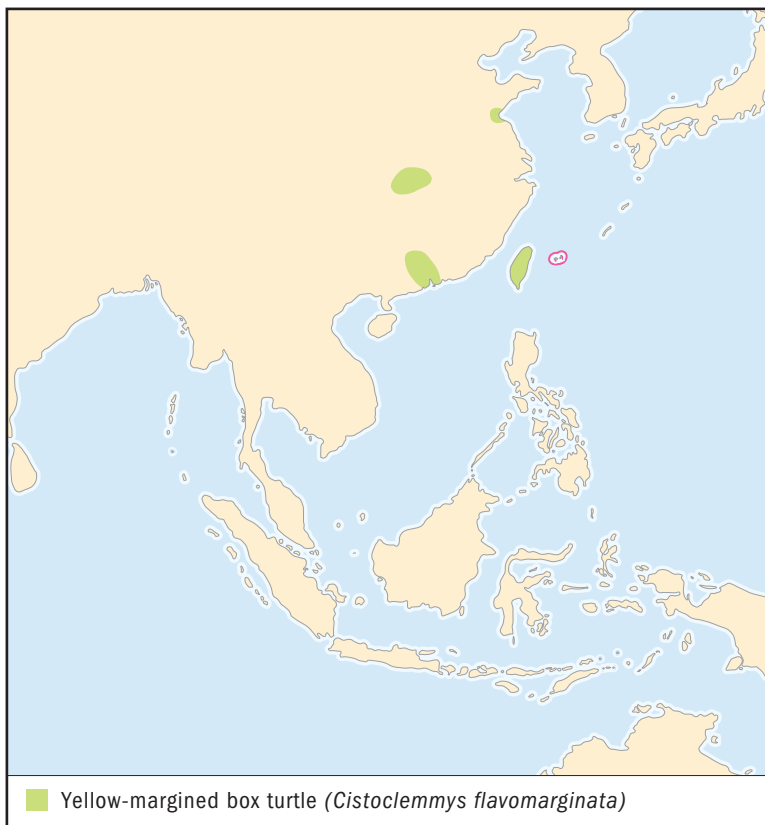
Eggs hatch in sixty to 272 days. In some species, males can become parents when they reach three or four years old, but females must wait until they are five to eight years old. Sometimes two different species of Eurasian pond and river turtles and neotropical wood turtles mate with each other and produce young turtles. This can happen often when two turtles from different species of this family are put together in one aquarium, but it may not happen as often in the wild.

EURASIAN POND AND RIVER TURTLES AND NEOTROPICAL WOOD TURTLES AND PEOPLE

Some people who live near these turtles collect them to eat their meat or to use them in making medicines. They are also popular in the pet trade. The painted terrapin, for example, is especially popular, because some people believe that this turtle brings good luck.

CONSERVATION STATUS

According to the World Conservation Union (IUCN) eleven species are Vulnerable, meaning that there is a high risk that they will become extinct in the wild. Eighteen species are Endangered, or facing a very high risk of extinction, and thirteen are Critically Endangered, or facing an extremely high risk of extinction. One species is Extinct; there is no longer any living turtle in the species. The U.S. Fish and Wildlife Service describes the Indian sawback turtle and river terrapin as Endangered. Turtle declines can be traced to too much collecting and to loss of their habitat. Efforts are under way to breed some of the most threatened species in captivity to increase their numbers.



YELLOW-MARGINED BOX TURTLE

Cistoclemmys flavomarginata

SPECIES ACCOUNT

Physical characteristics: The yellow-margined box turtle has a bright yellow stripe down its upper shell and another yellow stripe that runs from behind the eye onto the neck. The upper shell is arched and rounded, and the lower shell is large, with a side-to-side hinge that allows the turtle to tightly close it. In this small turtle, the upper shell measures just 7 inches (17.8 centimeters) in length.

Geographic range: This turtle is found in China, Taiwan, and the Ryukyu Islands of Japan.

Habitat: Yellow-margined box turtles mainly live in the warm-weather forests of southern China, Taiwan, and the Ryukyu Islands.

Yellow-margined box turtles mainly live in the warm-weather forests of southern China, Taiwan, and the Ryukyu Islands. (Lief Linder/Bruce Coleman Inc. Reproduced by permission.)



They sometimes travel into rice paddies and freshwater ponds and streams. Some of them only rarely, if ever, leave the forests.

Diet: Some members of this turtle group eat only plants, some eat only meat, and others eat both plants and meat.

Behavior and reproduction: Since they live on land, the yellow-margined box turtles must be able to defend themselves against animals that might attack and kill them. These predators (PREH-duh-ters) can easily outrun them, but they can protect themselves by tucking in their heads, legs, and tails and then using the hinges on their lower shells to seal shut the shells and keep the predators from reaching their soft flesh. If the weather turns particularly hot, the turtles may also hide inside the sealed shell so they do not dry out. When the cooler winter months arrive, the turtles bury themselves under leaves or hide under a log or inside another animal's underground burrow and wait for warmer weather.

During mating season, the male runs at and bumps against the female to encourage her to mate with him. Depending on where she lives, the female may nest from May or June through July, August, or September. Some nest only every other year, but they may make one to three nests in a single season. The female picks a spot in an open area at the edge of a forest, digs a shallow hole, and lays one to four eggs, ranging in length from 1.6 to 2.1 inches (40–53 millimeters) and in width from 0.9 to 1.1 inches (23–28 millimeters). An egg can weigh 0.4–1.0 ounces (11.3–28.3 grams). The eggs hatch in about

two months. The young cannot mate until they are twelve to thirteen years old.

Yellow-margined box turtles and people: Many local people eat this turtle or collect and kill it to make medicines. It is also popular in the pet trade.

Conservation status: According to the World Conservation Union, this species is Endangered. Threats to its survival include too much collection and the destruction of the forests where it lives. ■

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AMERICAN MUD AND MUSK TURTLES

Kinosternidae

Class: Reptilia

Order: Testudines

Family: Kinosternidae

Number of species: 25 species

family

CHAPTER

phylum

class

subclass

order

monotypic order

suborder

▲ family

PHYSICAL CHARACTERISTICS

American mud and musk turtles have glands, or sacs, along their sides that produce a musky substance that smells like the spray of a skunk. The upper shell, or carapace (KARE-a-pays), is rather tall, giving each turtle the outline of half a flattened ball when viewed from the side. The lower shell, or plastron (PLAS-trun), looks different in separate species. In some species the plastron has one or two hinges reaching from the left to the right side of the shell, but in others the shell has no hinges. The hinges allow the plastron and carapace to pull tight against one another after the turtle pulls its head, neck, legs, and tail into the shell. Some mud and musk turtles have a plastron that covers only part of the lower body, while others have a quite large plastron that almost entirely conceals the undersides.

All of these small to medium-sized turtles have barbels (BAR-buhls), which are small bits of flesh that dangle from the chin. A few have very large heads. Most of the species in this family have a carapace that is less than 8 inches (20 centimeters) long and in some cases grows to just 4 inches (10 centimeters) in length. The largest species, called the Mexican giant musk turtle, has a carapace that reaches 15 inches (38 centimeters) long. Males and females look quite similar. Males, however, usually have thicker and longer tails that are tipped with a spine. Males also have two rough, scaly patches on each hind leg.

GEOGRAPHIC RANGE

Members of the American mud and musk turtle family live in North and South America.

HABITAT

American mud and musk turtles are freshwater species. Most live in still or slow-moving waters and prefer lakes and ponds that are filled with water all year long. A few make their homes in shallow, seasonal ponds, which have water only a few months a year, usually during the spring season. American mud and musk turtles are found mainly in eastern and southern North America and as far south as Argentina in South America.

DIET

American mud and musk turtles are mainly meat eaters. They eat snails, clams, insects, worms, leeches, and sometimes freshly killed fishes they come across. Turtles that have large heads typically prefer snails and clams, which the turtle can easily open with its massive jaws. Turtles in seasonal ponds may also eat a large number of seeds.

BEHAVIOR AND REPRODUCTION

Although most American mud and musk turtles stay in the water for most of their lives, these turtles are only fair swimmers and move rather slowly. In the rainy season, some turtles may crawl onto land and look for food there, but for the most part, most of the trips to land are for nesting. Some turtles are active only during the day, and some only at night. Others may be up and about at any time of day or night. Those that live in warm, wet climates are active all year. In areas with cold winters and in deserts with long stretches of dry weather, the turtles may be active only a few months a year and spend the rest of the year underground, where they wait for better conditions. This period of inactivity in the winter is called hibernation (high-bur-NAY-shun). A period of inactivity in dry summers is called estivation (es-tuh-VAY-shun). In both cases, the turtle enters a state of deep sleep.

During breeding season, males and females have no real courtship, or mating, rituals. They mate in the water. The females scramble onto land to make their nests. Some dig holes,



THE LONG SLEEP

The yellow mud turtle holds the record among turtles for the amount of time it spends in a deep sleep every year. In very dry years this small, yellow-throated reptile buries itself in the ground and waits for the rains to come, even if that means the turtle has to stay underground up to ten months of the year. While underground the turtle enters a deep sleep. Usually this period of inactivity is called estivation if it occurs during the summer and hibernation if it occurs in the winter. Yellow mud turtles, however, are inactive from summer through fall and winter to the following spring. In other words, they both estivate and hibernate. When the spring rains flood the ground, the turtles crawl out of their slumber to mate, eat, and prepare for another long sleep.

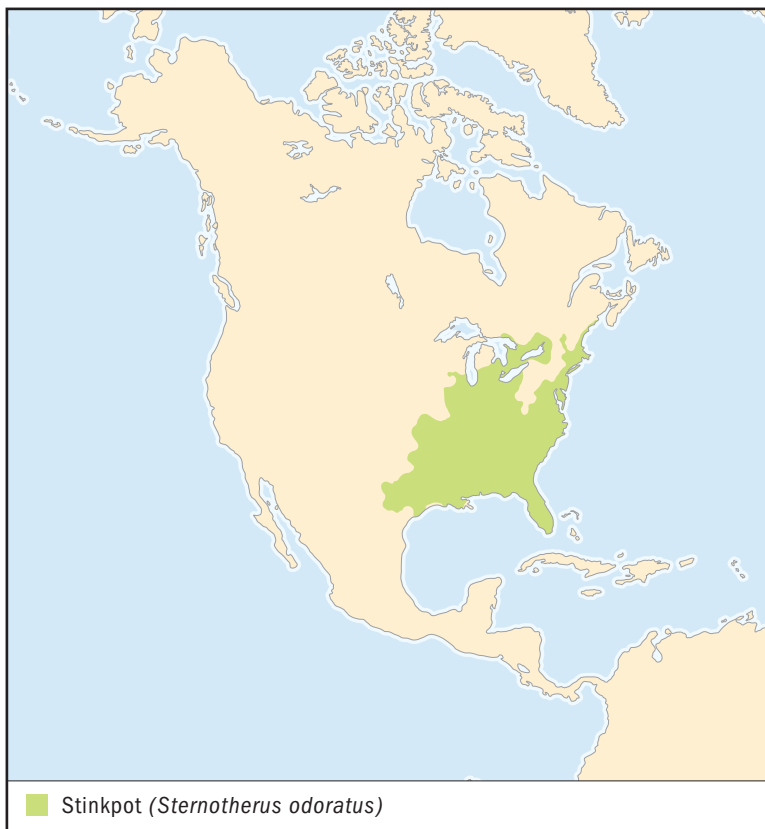
lay their eggs at the bottom, and then bury them. Others bury themselves first and then dig a deeper hole for their eggs. Still other species skip the hole and simply lay their eggs among leaves on the surface of the ground. Females usually lay three to six eggs in each clutch, or group of eggs, although some clutches have as few as one egg or as many as twelve eggs. The female may lay up to six clutches a year. The oblong eggs range from 0.9 to 1.7 inches (2.3–4.3 centimeters) long and from 0.6 to 1.0 inches (1.5–2.5 centimeters) wide. The eggs hatch seventy-five days to a year after being laid. The nest temperature controls whether the eggs in most species hatch into males or females. Very warm or very cold temperatures produce females, and medium temperatures produce males. In a few species, such as the Mexican giant musk turtle and Pacific Coast giant musk turtle, the nest temperature has no effect on whether the eggs become males or females.

AMERICAN MUD AND MUSK TURTLES AND PEOPLE

Other than once in a while collecting a turtle for the pet trade or for its meat value, people generally leave mud and musk turtles alone.

CONSERVATION STATUS

Most species of American mud and musk turtles are quite common in their habitats, but according to the World Conservation Union (IUCN), four species are Vulnerable, which means they face a high risk of extinction in the wild. Three of the four live in very small areas, and the fourth lives in a disappearing habitat. The U.S. Fish and Wildlife Service lists one species, the flattened musk turtle, as Threatened, or likely to become endangered in the near future.



STINKPOT

Sternotherus odoratus

SPECIES ACCOUNT

Physical characteristics: As its name says, the stinkpot can give off quite an odor. This odor comes from a substance known as musk, which comes from sacs, or glands, on the sides of the turtle's body. The stinkpot is small, has a somewhat rounded upper shell, or carapace, and a small lower shell, or plastron, that covers only the center of its underside. The plastron has one side-to-side hinge near the front. The turtle's head typically has two yellow stripes on each side that run backward from a pointy snout. The stinkpot also has at least two barbels, or bits of hanging flesh, on its chin and neck. Stinkpots, which are also known as common musk turtles, grow to about 5.4 inches (13.7 centimeters) in carapace length, although some adults only reach about 3 inches (7.6 centimeters) long.



The stinkpot is a small freshwater turtle most at home in mud-bottomed, weedy lakes and ponds in southeastern Canada and through much of the eastern half of the United States. (Henri Janssen. Reproduced by permission.)

Geographic range: Stinkpots are found in Canada and the United States.

Habitat: The stinkpot is a small freshwater turtle most at home in mud-bottomed, weedy lakes and ponds in southeastern Canada and through much of the eastern half of the United States.

Diet: Stinkpots eat a variety of animals and plants. Their diet includes worms, snails, clams, crayfish, insects, tadpoles, fishes and their eggs, and even bites of flesh they take from dead animals. Stinkpots are also fond of seeds, tiny aquatic plantlike growths called algae (AL-jee), and pieces of plants that grow in the water.

Behavior and reproduction: Like other members of their family, stinkpots stay in the water much of their lives but are poor swimmers and often simply walk along the water bottom looking for food. Although they are small, stinkpots can put up quite a fight if an animal attacks them or if a human tries to pick one up. Often a turtle that feels threatened ducks its head, legs, and tail as far as possible into the shell. At other times, however, the stinkpot snaps out with its mouth wide open, sometimes taking a firm bite at the attacker.

Stinkpots sometimes sunbathe, or bask, on land. Turtles that live in a warmer area may stay active all year long. Turtles that live in an area that has cold winters may hibernate for a few months.

Most musk turtles mate in the spring or fall, but some mate at other times of the year. The male may try to attract the female by biting at her shell or nudging her, but these turtles often mate without much fuss. The females lay their eggs from spring to midsummer, sometimes as early as February in warmer areas. Some female stinkpots simply drop their eggs among leaves, but others dig a hole, lay the eggs inside, and then bury them. The white, oblong eggs range from 0.9 to 1.2 inches (2.3–3.0 centimeters) long and from 0.5 to 0.7 inches (1.3–1.8 centimeters) wide. The female usually lays a clutch, or group, of two to five eggs at a time but sometimes lay as few as one or as many as nine eggs. The stinkpot may lay one or two clutches a year in colder areas and up to four clutches a year in southern climates. The eggs hatch in about sixty-five to eighty-five days. Very warm and very cool nest temperatures produce females, and temperatures in between produce males.

Stinkpots and people: Some people collect stinkpots for the pet trade, but this practice is not very common.

Conservation status: Neither the World Conservation Union (IUCN) nor the U.S. Fish and Wildlife Service consider the stinkpot threatened. ■

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AFRICAN SIDE-NECKED TURTLES

Pelomedusidae

Class: Reptilia

Order: Testudines

Family: Pelomedusidae

Number of species: 18 species

family

CHAPTER

phylum

class

subclass

order

monotypic order

suborder

▲ family

PHYSICAL CHARACTERISTICS

African side-necked turtles are small- to medium-sized turtles that fold their necks sideways under their shells, rather than pulling them straight back into the shell, along with their heads. They have five claws on each hind foot. The upper shell, or carapace (KARE-a-pays), of adults usually is less than 1 foot (30.5 centimeters) long, but the length of shells can range from about 4 to 21.6 inches (10–55 centimeters). The turtle has a large lower shell, or plastron (PLAS-trun), that covers much of the chest and belly. Sometimes the plastron has a hinge that allows the animal to pull its lower shell quite tight against the upper shell and offers protection from predators (PREH-duh-ters), or animals that seek these turtles out as a source of food. In addition, the turtles have glands, or special organs, along the sides of their bodies that give off a musky, or earthy, smell to ward off attackers.

GEOGRAPHIC RANGE

African side-necked turtles live in Africa, Madagascar, and the Seychelles Islands, which are northeast of Madagascar.

HABITAT

These turtles often are seen in freshwater lakes and rivers that hold water all year long, but they also are found in temporary freshwater ponds, which lose their water during the dry season. Some side-necked turtles, including those that are called “mud turtles,” spend much of their time in soft-bottomed ponds that are filled with water for only a few weeks every year.

DIET

African side-necked turtles are mainly meat eaters, although a few will eat plants. The main items in their diet are worms; clams and other mollusks, or soft-bodied animals covered by shells; shrimp and other crustaceans (krus-TAY-shuns), or animals with a soft, segmented body covered by shells; insects; fish; frogs and other amphibians (am-FIB-ee-uns), or animals that spend part of their lives in water and part on land. These turtles also eat whatever dead animal matter they can find. Those that eat plants prefer water lettuce and grasses that grow in lakes, ponds, and streams and various fruits that drop into the water from overhanging trees.

BEHAVIOR AND REPRODUCTION

Although these side-necked turtles can be quite noticeable in their habitat, scientists know very little about their behavior. The turtles bask, spending warm days sunning themselves near the shoreline. They are especially active during the wet season, when they may roam over land. When the weather turns dry, many side-necked turtles seek shelter underground. Those that live in the cool, mild climate of the far south of Africa may hibernate, or become inactive, on land or under water through the winter months.

These turtles breed during late spring or summer, with the females laying six to four dozen oblong-shaped eggs. Scientists suspect that the turtles may have more than one set of young every year. The outside temperature controls how many eggs in a clutch, or group, will develop into males and how many will develop into females. Scientists call this “temperature-dependent sex determination,” or TDSD. If the weather is constantly warm or especially cool, most of the young are females. If the weather is more temperate, or mild, most are males.

AFRICAN SIDE-NECKED TURTLES AND PEOPLE

African side-necked turtles are unpopular as pets and as food, but people occasionally eat them. One reason for their lack of popularity is their smell. The musk glands are very powerful weapons against predators, including humans. Pet owners who



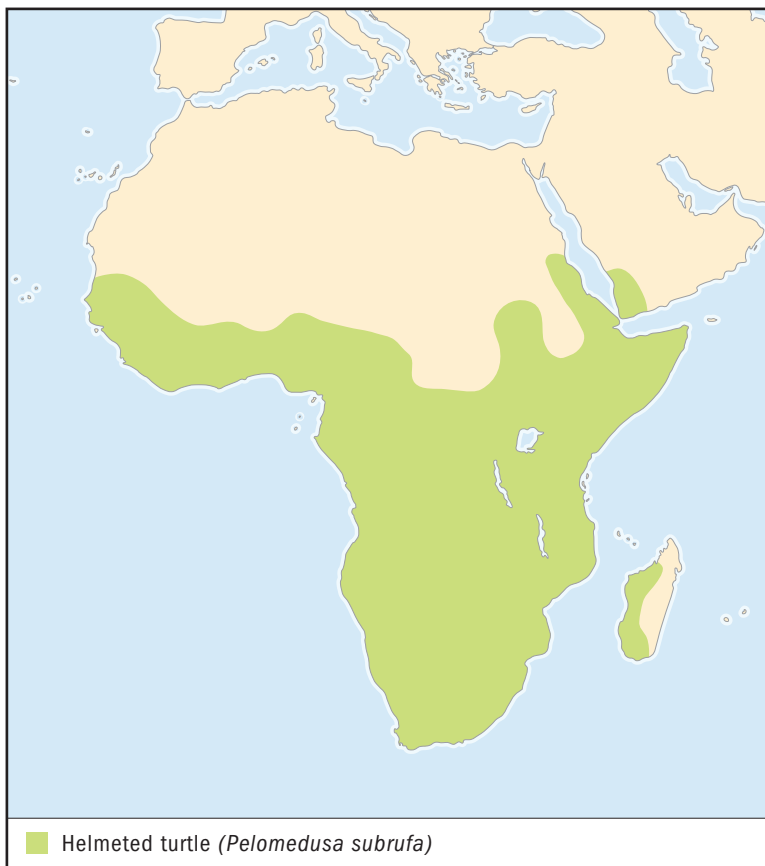
THE TURTLE-RHINO CONNECTION

Although few people would think that turtles get much of their food from rhinoceroses, several African side-necked turtles do rely on the large mammals for some of their food. The turtles do not eat the rhinos but rather wait for them to wade into a water hole and then swim up to nibble off the ticks that cling to their hides. Rhinos are not the only buffet table for the turtles. They will do the same with other large herding animals that stop by for a drink.

keep African side-necked turtles often find that they are unfriendly and can be aggressive; they will bite at other turtles in the same aquarium and will nip at humans who put their hands too close.

CONSERVATION STATUS

In 2003 the World Conservation Union (IUCN) listed one species, the Seychelles mud turtle, as Extinct; none of these turtles is still alive. In addition, it listed the Magdalena river turtle and the Madagascar big-headed turtle as Endangered, meaning that it faces a very high threat of extinction in the wild. Five species are Vulnerable, which means that there is a high threat of their extinction, and one is Near Threatened, meaning that it is at risk of becoming threatened with extinction soon. Many of these species live in very small areas, so even slight disturbances can kill populations and possibly the entire species. For example, the Broadley's mud turtle, which is listed as Vulnerable, is found only in Lake Rudolph (also known as Lake Turkana) in Kenya.



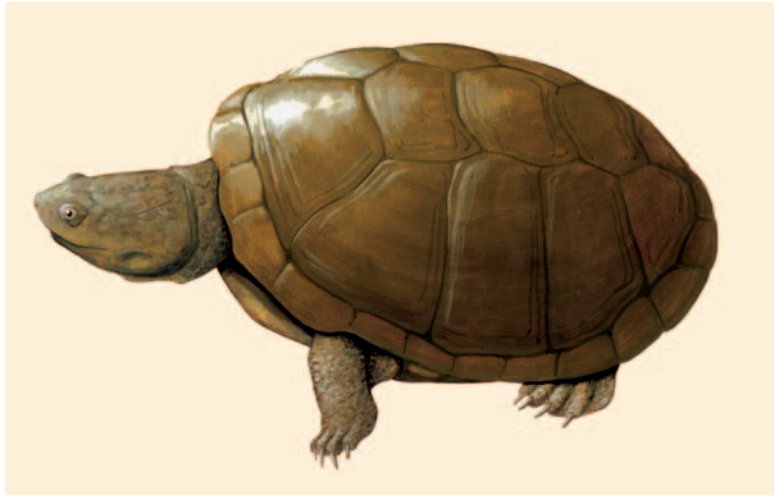
HELMETED TURTLE

Pelomedusa subrufa

SPECIES ACCOUNT

Physical characteristics: Adult helmeted turtles have upper shells that reach 13 inches (33 centimeters) in length. The brown to greenish-brown upper shell is fairly flat. The lower shell is usually yellow or cream-colored, sometimes with dark seams or large, dark smudges. The lower neck is also yellow or cream-colored. These turtles have a rather pointed face with a mouth that looks as if it is set in a permanent grin. Males and females look alike, except that males have longer tails and concave, or indented, lower shells. Males may have red spots or white coloration on their heads during mating season.

Helmeted turtles are mostly meat eaters, feeding on worms, snails and clams, insects and other small invertebrates, fishes, frogs, and whatever dead animals they can find. (Illustration by Barbara Duperron. Reproduced by permission.)



Geographic range: Helmeted turtles inhabit Madagascar, southern Saudi Arabia, Yemen, and central to southern Africa.

Habitat: Helmeted turtles can be found in various water bodies, including ponds, marshes, and streams that are filled with water all year long and temporary ponds that dry up from time to time. They move from water site to water site during the year, so they are often seen on land.

Diet: Like other side-necked turtles, helmeted turtles are mostly meat eaters, feeding on worms; snails and clams; insects and other small invertebrates (in-VER-teh-brehts), or animals without backbones; fishes; frogs; and whatever dead animals they can find. They also eat small reptiles and mammals. They are some of the only reptiles that will band together and hunt as a pack to catch, drown, and tear apart birds, mammals, and other reptiles. An occasional piece of fruit or water-living plant rounds out the diet.

Behavior and reproduction: Except those individuals that live in the hottest of climates, these turtles spend much of the day basking near the shoreline. They are also noticeable when they are moving from water body to water body. The young will eat all day long and into the night, but the adults tend to feed only in the early morning or early evening hours. When the weather is too dry, they will bury themselves in the mud until the rains come. This period of inactivity in dry weather, which is called estivation (es-tuh-VAY-shun), can last for months. In the cooler areas where they live, they hibernate by finding a spot under leaves or below ground to wait out the winter.

Mating usually happens in the spring. During courtship, a male will chase a female, touching and sometimes nipping at her back legs and tail; bob his head from side to side; and shoot water out of his nostrils. The females lay one set of thirteen to forty eggs every year (fewer than twenty eggs is typical) in a nest that is sometimes set among rocks. The outside temperature determines the number of male and female young in the clutch. Especially warm or cool temperatures will produce more females, while moderate temperatures yield males.

Helmeted turtles and people: Although people frequently see this common turtle, it does not usually notice or mind their presence, even sometimes entering and making good use of man-made ponds. Some people eat helmeted turtles or drain their blood for folk medicines; a few become pets. These practices have not affected the survival of the species.

Conservation status: The helmeted turtle is not threatened. ■

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BIG-HEADED TURTLE

Platysternidae

Class: Reptilia

Order: Testudines

Family: Platysternidae

One species: Big-headed turtle
(*Platysternon*
megacephalum)

family

CHAPTER

phylum

class

subclass

order

monotypic order

suborder

▲ family

PHYSICAL CHARACTERISTICS

The family Platysternidae has only one member, the big-headed turtle, which has the scientific name *Platysternon megacephalum*. This small to medium-sized turtle is most known for its huge head, which is about half as wide as the upper shell. The head is shaped like a triangle and covered with a single, large, hard scale, known as a scute (SCOOT). The upper shell, or carapace (KARE-a-pays), is quite flat and sometimes has a single ridge running down the middle from front to back. The carapace is yellow to dark-brown and may have a pattern on it. A few big-headed turtles have red or pink markings on the carapace. Like that of many other turtles, the lower shell, or plastron (PLAS-trun), of the big-headed turtle is yellow and covers most of the underside. Unlike those of many other turtles, the upper and lower shells of the big-headed turtle are not connected by a bony bridge, but by softer, more flexible tissue, called ligaments (LIH-guh-ments). The upper jaw, also known as the beak, comes to a sharp point in the front. The big-headed turtle has a scaly tail that is nearly as long as the upper shell. The feet have obvious claws and just a bit of webbing between the toes. Turtle size is measured by the length of the carapace. The carapace length of the big-headed turtle reaches about 8 inches (20 centimeters). Males and females are similar, but the males have a more indented plastron.

GEOGRAPHIC RANGE

The big-headed turtle lives in China, Laos, Myanmar, Thailand, and Vietnam.

HABITAT

The big-headed turtle is rare and has been found only in small mountain streams from southern China to Thailand and southern Myanmar. These turtles appear to be very particular about the type of stream, living only in rock-bottomed, cool waters and only in mountainous regions up to 6,600 feet (2,000 meters).

DIET

Because the big-headed turtle is so rare, scientists have been able to learn about its diet only by observing captive, rather than wild, turtles. In captivity, the turtles eat meat, fish, and insects. The big-headed turtle is probably a meat-eater in the wild and may eat no plants at all. The turtle most likely gets most of its meals by gathering insects, mollusks, crustaceans, and other small invertebrates from the stream bottom, but it also may crawl out of the water onto shore and search for food on land. Invertebrates (in-VER-teh-brehts) are animals without backbones. Both mollusks (MAH-lusks) and crustaceans (krus-TAY-shuns) are invertebrates with shells. Mollusks, such as snails and clams, have an unsegmented body, and crustaceans, such as crayfish and shrimp, have a segmented body.

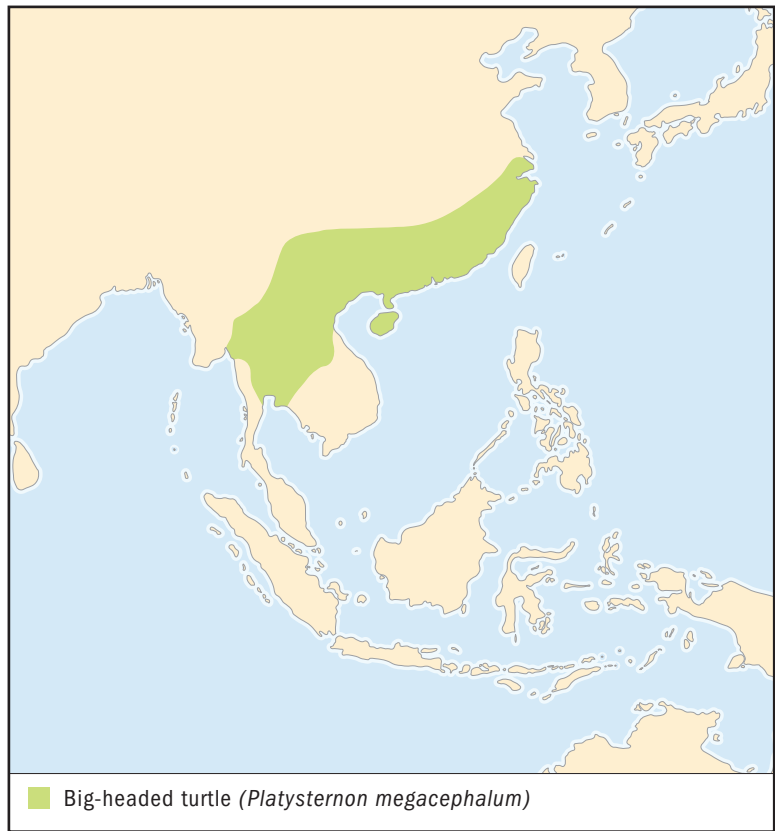
BEHAVIOR AND REPRODUCTION

All turtles fall into one of two groups: the Cryptodira or the Pleurodira. The difference between the two is the way each pulls its neck and head back toward or into the shell. The Cryptodira, also known as hidden-necked turtles, can pull their heads and necks straight back and are usually able to tuck both into the shell. The Pleurodira, also known as side-necked turtles, can only pull their necks sideways rather than straight back, so most tuck their head and neck along the side of the shell. The big-headed turtle is unusual because it is a Cryptodira in that it can pull its neck backward, but it cannot draw its head into the shell because its head is so large.



CHANGES IN CLOSEST RELATIVES

Big-headed turtles are the only species in the family Platysternidae. Scientists once believed these turtles were most closely related to New World pond turtles, including the painted turtles that are common in much of North America. That idea has faded, however. Now many people believe the closest relatives are the snapping turtles, which are in the family Chelydridae, or possibly the Eurasian pond and river turtles and neotropical wood turtles of the family Geoemydidae. A few scientists believe the big-headed turtles should be included in the snapping turtle family, but most argue that these turtles are different enough to be in a separate family.



Most hidden-necked turtles are shy animals that pull their heads, limbs, and tails into the shell whenever they feel threatened. Attacking animals, called predators (PREH-duh-ters), find it difficult, if not impossible, to get past the shell, and the turtle usually survives with little if any injury. The big-headed turtle cannot hide this way and instead defends itself by drawing its legs and tail into the shell and then ducking down its head so that the chin is on the ground and only the hard top shows. Sometimes the turtle may lash out with a quick bite. It may continue biting, and biting quite hard, until the predator leaves. Captive turtles also squeal when threatened. In addition, this turtle has glands, or sacs, on the sides of the shell that squirt out a bad-smelling musk, which may be used to scare off predators.

The big-headed turtle is a surprisingly good climber and uses its long tail for balance. The turtle may also use its beak to grab vertical surfaces when climbing. When placed in a fenced-in, indoor area, the turtle is able not only to climb over the fence



The big-headed turtle is most known for its huge head, which is about half as wide as the upper shell. The head is shaped like a triangle and covered with a single, large, hard scale, known as a scute. (©Tom McHugh/Photo Researchers, Inc. Reproduced by permission.)

but also to grab onto window curtains and scramble all the way to the ceiling. In the wild, the turtles likely put this climbing ability to good use for crawling over rocky stream bottoms and against fast current. Some people report seeing the turtles climbing trees and bushes in the wild.

Big-headed turtles appear to be nocturnal (nahk-TER-nuhl) and crepuscular (kreh-PUS-kyuh-lur) in the wild. Nocturnal means they are active at night, and crepuscular means they are active at dusk and dawn. During the day, these turtles take cover and relax underwater beneath logs or rocks and wedged into cracks in boulders. Big-headed turtles that live in colder waters disappear in the winter. Although no one knows where the turtles go, scientists believe they probably hibernate (HIGH-bur-nayt), which means they enter a deep sleep. Some people think the turtles may hibernate in a protected spot on land.

Little is known about the courtship, or mate-attracting activities, of big-headed turtles or about their mating and nesting behaviors. In the wild the females probably nest sometime from May to August. The only egg ever seen hatching did so in captivity, and it hatched in September. In each clutch, or nest of eggs, females lay one or two eggs, sometimes as many as four. The eggs are 1.5–1.7 inches (3.8–4.3 centimeters) long and are about 0.9 inches (2.3 centimeters) wide. The eggs are quite large considering that the turtle's carapace length only reaches 8 inches (20 centimeters). No one knows whether the turtle

lays one or more than one clutch a year. In captivity these turtles can live to be as old as twenty-five years.

BIG-HEADED TURTLES AND PEOPLE

Some people consider the meat of the big-headed turtle a delicacy, so the turtles face threats from hunters. Other people collect the turtles for use in folk medicines. Despite their tendency to bite, these turtles are fairly popular pets.

CONSERVATION STATUS

According to the World Conservation Union (IUCN) the big-headed turtle is Endangered because of overcollection. Endangered means that this species is facing a very high risk of extinction in the wild in the near future.

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family CHAPTER

AFRO-AMERICAN RIVER TURTLES

Podocnemididae

Class: Reptilia

Order: Testudines

Family: Podocnemididae

Number of species: 8 species

PHYSICAL CHARACTERISTICS

The Afro-American river turtle is described as a “side-necked” turtle because it cannot pull its neck and head straight back into the shell. Instead, it folds its neck sideways under its shell. The largest member of this family has an upper shell, or carapace (KARE-a-pays), that reaches 42 inches (107 centimeters) in length. Afro-American river turtles have only four toes on their hind feet. Some species also have barbells (BAR-buhls), which are bits of flesh that dangle from their chins. Some scientists believe that these turtles should be grouped with similar turtles in the family Pelomedusidae, which live in mainly in Africa.

GEOGRAPHIC RANGE

Afro-American river turtles are found in Madagascar and northern South America.

HABITAT

Many of these freshwater turtles live on riverbanks and in large lakes, but some also live in streams and swamps, wetlands partly covered with water. Sometimes they move into flooded forests. Their range, or the area in which they live and feed, includes Madagascar, which lies off the eastern coast of southern Africa, and northern South America.

DIET

Afro-American river turtles are mainly plant eaters; they are especially fond of fruits that drop off the trees on the shore and fall into the water. They also eat stems, leaves, and grasses.

phylum

class

subclass

order

monotypic order

suborder

▲ **family**



THE LARGEST TURTLE EVER

Afro-American river turtles live only in South America and thousands of miles away in Madagascar, but it was not always that way. Scientists have found fossils (FAH-suhls), or the dead remains, of these turtles on every continent except Australia and Antarctica. Although the river turtles live only in freshwater rivers, ponds, and streams, the fossils show that the turtles once also lived in saltwater and on land. One of the species in this family was the largest turtle that ever lived. This turtle, known as *Stupendemys geographicus*, had an upper shell that measured 7.5 feet (2.3 meters) in length and might have weighed 4,000–5,000 pounds (1,814–2,268 kilograms).

They dine on meat once in a while, and when they do, they eat insects, fishes, or other freshwater animals.

BEHAVIOR AND REPRODUCTION

These turtles' behavior depends on where they live. Some of them hardly ever leave their river homes. In these species, the female often makes the only trips on land. To lay her eggs, she crawls up onto a sandbar, a ridge of sand built up by currents in the water. Besides those turtles that live only in rivers, other species live in calm pockets of water along the river, sometimes in flooded forest pools, and the females lay their eggs on riverbanks. Still other species of these turtles also make their homes in small streams and ponds, and the females make long trips over land to nest. When the dry season empties the stream or pond, they crawl underground, become inactive, and wait for the rains to return. The Madagascan big-headed turtle, for example, spends the dry season buried in the mud. Scientists know few details about the activities of the Afro-American

river turtles, including whether the males "court" the females to attract them or how they mate.

Nesting time is tied to the rainy season. As the rainy season ends, the females typically start to sunbathe in the early morning and late afternoon. She then begins her migration to a nesting site, which can take a very long time. Many Afro-American river turtles nest in large groups. Each female of the group digs her own hole, where she lays and buries her eggs. The females of some species are known to use only their hind legs in digging the nest and covering up their eggs. Different species lay varying numbers of eggs in their nests. The smaller river turtles, for instance, lay about five to twenty eggs per nest, while the largest species can lay up to 156 eggs. In all species except the South American river turtle, the eggs are longer than they are wide. The South American river turtle has round eggs. Some species make one nest a year, and others make two or more. Female Madagascan big-headed turtles skip a year between

nestings. Nest temperature controls the number of males and females in the nest, with very warm and sometimes particularly cold temperatures producing females, and more moderate, or mild, temperatures producing males. The eggs hatch in forty to 149 days.

AFRO-AMERICAN RIVER TURTLES AND PEOPLE

People hunt these turtles for their meat and their eggs.

CONSERVATION STATUS

According to the World Conservation Union (IUCN), seven of the eight species face some threat of survival. Two species are Endangered, meaning that there is a very high risk that they will become extinct in the wild soon. Four species are Vulnerable, facing a high risk of extinction. One species is listed as Lower Risk: Conservation Dependent, meaning that its survival depends on conservation measures. The U.S. Fish and Wildlife Service lists two species as Endangered. Much of the decline in this family of turtles can be traced to too much hunting of adults and collecting of their eggs. Efforts are under way to protect the turtles' nesting areas, so that the females have a safe place to lay their eggs.

SPECIES ACCOUNT



SOUTH AMERICAN RIVER TURTLE *Podocnemis expansa*

Physical characteristics: Also known as the arrau or tartaruga, the South American river turtle sometimes is described as “giant” because it is so large. The upper shell can measure more than 3.5 feet (1 meter) in length. The carapace is rather flat and a bit wider at the rear than it is at the front. It is typically dark brown, but in spots it may be worn away to a paler, almost orange color in older turtles. The head is dark on top and down the cheeks but pale yellowish-tan on the bottom and on the neck. Two barbels hang from its chin. Young



Also known as the arrau or tartaruga, the South American river turtle sometimes is described as “giant” because it is so large. The upper shell can measure more than 3.5 feet (1 meter) in length. (Illustration by Jonathan Higgins. Reproduced by permission.)

turtles have a more patterned head with yellow blotches outlined or spotted in black.

Geographic range: These turtles live in northern South America.

Habitat: These freshwater turtles live in large river branches in the Orinoco and Amazon river systems of northern South America. If the water rises high enough and overflows into areas next to the rivers, they may move into these flooded areas, too.

Diet: This species eats plants, insects, and sponges, but it prefers the fruits of riverside trees.

Behavior and reproduction: Nesting begins shortly after the rainy season ends. During the nesting period, which may last ten to sixty days, the female travels upstream or downstream to reach a nesting site, which she shares with other females. Late at night the females climb onto a sandbar, and each one uses both her front and hind legs to dig a hole more than 1 yard (1 meter) around and 1.5 feet (0.5 meters) deep. At the bottom of the hole, the female uses only her hind legs to continue digging another pit, where she lays her eggs. Unlike other members of the family, which lay oblong eggs, the South American river turtle lays round eggs. Most of the eggs are about 1.6 inches (4 centimeters) across, but one or two may have a diameter twice that size. A typical nest holds about eighty eggs, but it contain as few as forty-eight eggs or as many as 156 eggs.

The females make only one nest per year. After laying her eggs, the female covers up at least the bottom hole, containing the eggs, and sometimes also the hole above it. The eggs hatch in about a month

and a half; within a couple of days after hatching, the young make their way out of the nest. The sex of the hatchlings, or young turtles, depends on the temperature of the nest: extremely warm or very cool temperatures produce females, whereas temperatures that are more moderate, or mild, produce males. Scientists know few details about other activities of these large turtles.

South American river turtles and people Although it is now illegal to do so, some people still hunt and kill adults and sometimes even baby turtles for their meat and collect eggs for the oil they contain.

Conservation status The U.S. Fish and Wildlife Service lists this turtle as Endangered, which means that it is facing a risk of extinction in the wild. The World Conservation Union (IUCN) lists it as Lower Risk/Conservation Dependent, which means that its survival relies on sound conservation efforts. These listings result from the fact that humans have killed adults and destroyed their eggs over many decades. The turtle's range became smaller and smaller as the hunting and collecting continued. Efforts are under way to protect their nesting areas and to prevent further collecting of turtles or their eggs. ■

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family CHAPTER

TORTOISES Testudinidae

Class: Reptilia

Order: Testudines

Family: Testudinidae

Number of species: About 47
species

PHYSICAL CHARACTERISTICS

Tortoises are small- to large-sized, land-living turtles. Most of them have a tall upper shell, or carapace (KARE-a-pays). Their back legs are thick and somewhat resemble the legs of an elephant. The front legs, on the other hand, are rather flat and covered with large scales. Their toes have no webbing between them, and many species have five claws on each front foot. The largest members of this family can weigh as much as 562 pounds (255 kilograms) and have upper shells that grow to 4 feet 7 inches (1.4 meters) long. Some of them have a hinge in the carapace or in the lower shell, which is called the plastron (PLAS-trun).

GEOGRAPHIC RANGE

Tortoises exist on all large islands and continents, except Australia and Antarctica.

HABITAT

Tortoises live in many habitats, including deserts, grasslands, shrubby areas, and forests. Most live in warmer climates in North and South America, Europe, Asia, and Africa, and many make their homes on large islands in the ocean.

DIET

The tortoises are mainly plant-eaters, eating everything from grasses, flowers, and leaves to fruits and seeds. If they come across them, a few tortoises will also eat insects, worms, or other living or dead animals.

phylum

class

subclass

order

monotypic order

suborder

▲ **family**



TORTOISES AND BIRDS

Galápagos tortoises have an unusual relationship with small birds, known as Darwin's finches. Ticks and other small biting insects often hitch a ride on a tortoise's skin, but the tortoise frequently cannot reach them to remove them. The birds feed on these same organisms. Darwin's finches and Galápagos tortoises seem to have struck a deal. When the finches fly in, the tortoises stand up as tall as they can and stretch out their necks, so the birds can pick off the insects and mites from every nook and cranny on their skin. Both the birds and the tortoises benefit: The bird gets an easy meal, and the tortoise gets some needed relief.

BEHAVIOR AND REPRODUCTION

Tortoises are known for their slow, lumbering movements on land. The males often fight among themselves, either by ramming their shells against one another or by biting at each other's legs. A male will also do the same things to a female in an attempt to convince her to mate with him. In addition, he will bob his head at her and chase her. Females lay from one to 51 eggs at a time. Each of the round or oblong eggs is about 1 to 2 inches (3 to 6 centimeters) in diameter and is typically quite brittle, or easily broken. Some females may not nest every year, but when they do, they may have more than one clutch, or nest of eggs, per season. Although scientists have not tested all of the species, the eggs in most become males or females based on the temperature of the nest. A particularly warm nest produces mostly females, and an especially cool one produces males. The eggs typically hatch in 100 to 160 days, but one species' eggs hatch only after 18 months. Some species may live 200 years or more.

Many tortoises become inactive in the summer when the weather is very dry. Many simply hide during the day in a shady spot, but some will dig a hole, or burrow, and spend the hottest part of the day there. On cooler days, some of these tortoises will seek out a warm spot and sunbathe, or bask, to increase their body temperature. Those species that live in colder climates may become inactive in the winter months.

TORTOISES AND PEOPLE

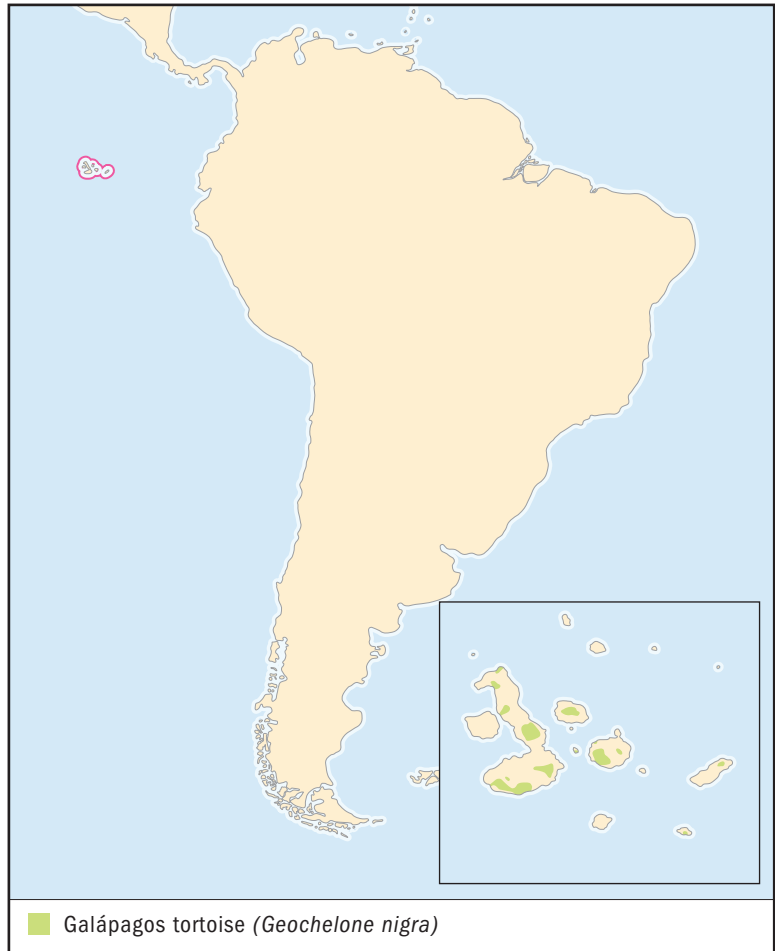
People hunt these tortoises for food and traditional medicines and collect them for the pet trade.

CONSERVATION STATUS

According to the World Conservation Union (IUCN), one species is Critically Endangered or facing an extremely high risk of extinction in the wild, seven are Endangered or facing a very high risk of extinction in the wild, and sixteen are Vulnerable

or facing a high risk of extinction in the wild. The U.S. Fish and Wildlife Service lists two U.S. species as Threatened or likely to become endangered in the near future and five foreign species as Endangered, or in danger of extinction throughout all or a significant portion of their range. Although most countries make collecting illegal, it still continues. People find these land-living turtles easy to find and collect.

SPECIES ACCOUNTS



GALÁPAGOS TORTOISE *Geochelone nigra*

Physical characteristics: This large, bulky tortoise usually has a tall and rounded, dark-colored upper shell that may be black, gray, or brown. Sometimes the upper shell, or carapace, is saddle-shaped. The carapace can measure up to 51 inches (130 centimeters) in length.

Geographic range: They only live on the Galápagos Islands.

Habitat: This species lives on the volcanic Galápagos Islands in the Pacific Ocean, west of Ecuador in South America. They make their homes anywhere from rather dry to moist areas.



The Galápagos tortoise has become a prized tourist attraction on the Galápagos Islands. (Illustration by Joseph E. Trumpey. Reproduced by permission.)

Diet: The Galápagos tortoise eats almost nothing but plants, including grasses, cacti, fruits, and leaves.

Behavior and reproduction: Active during the day, they spend their nights sleeping among plants or rocks. Males of this species, like the males of some other species, fight one another by ramming their shells together. Males do the same thing to females during mating season, which runs from December to August. During mating, he will make roaring noises. The female lays up to four sets, or clutches, of eggs from late June to December. She digs a hole, drops in two to nineteen eggs, and then buries them. She provides no other care for the eggs or young. The round eggs measure 2.2 to 2.6 inches (56 to 65 millimeters) in diameter. The eggs hatch eighty-five to two hundred days later.

Galápagos tortoises and people: Rarely collected for its food, this tortoise has become a prized tourist attraction on the Galápagos Islands.

Conservation status: According to the World Conservation Union (IUCN), the Galápagos tortoise is Vulnerable, which means it faces a high risk of extinction in the wild. Certain populations of this tortoise have disappeared completely. The U.S. Fish and Wildlife Service lists the tortoise as Endangered, or in danger of extinction throughout all or a significant portion of its range. Many of them die from attacks by cats, rats, dogs, and pigs. ■



DESERT TORTOISE

Gopherus agassizii

Physical characteristics: This medium-sized tortoise has a tall, dome-shaped upper shell, or carapace, and flat front legs. The carapace can reach up to 19 inches (49 centimeters) in length.

Geographic range: Desert tortoises live in the United States and Mexico.

Habitat: Found in the southwestern United States and northwestern Mexico, this species makes its home in cactus deserts and spots with thorny shrubs.

Diet: The desert tortoise eats mostly plants, including grasses, cacti, and flowers.



The desert tortoise makes its home in cactus deserts and places with thorny shrubs. (©Tim Davis/Photo Researchers, Inc. Reproduced by permission.)

Behavior and reproduction: The desert tortoise is unusual in that it makes burrows into which it crawls to escape attackers and hot, dry weather. In some cases, the burrow is barely big enough for the tortoise to fit inside, but in others, it can be up to 33 feet (10 meters) long. In especially cold weather, the tortoises will crawl to the deepest part of the burrow and enter a deep sleep, called hibernation (high-bur-NAY-shun). When they are active, desert tortoises notice and interact with one another. When two meet each other, they bob their heads back and forth. During mating season, which runs from spring to fall, a male will try to convince a female to pair with him by biting at her legs, bobbing his head at her, and occasionally by ramming into her shell with his. A male frequently will ram shells with other males, too. He often hisses or grunts while mating with a female. The female lays eggs one to three times a year, usually laying five or six eggs at a time, although she may lay as few as two or as many as fifteen. Sometimes, she skips an entire year. The eggs range from 1.6 to 1.8 inches (4.0 to 4.5 centimeters) long and 1.3 to 1.5 inches (34 to 38 centimeters) wide. They hatch in about three to four months.

Desert tortoises and people: People hunt these tortoises for their meat, which is often shipped to Asian food markets located in the western United States.

Conservation status: According to the World Conservation Union (IUCN), the desert tortoise is Vulnerable, which means that it faces

a high risk of extinction in the wild. The U.S. Fish and Wildlife Service lists the tortoise as Threatened, or likely to become endangered in the foreseeable future. The danger to the tortoises comes from both loss of their habitat and a dangerous bacterial infection. ■

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family CHAPTER

SOFTSHELL TURTLES

Trionychidae

Class: Reptilia

Order: Testudines

Family: Trionychidae

Number of species: 25 species

PHYSICAL CHARACTERISTICS

From above, softshell turtles look almost like rubber dinner plates swimming through the water. Although the turtles actually have a bony upper shell, it is completely covered by leathery skin, which usually reaches out past the edge of the bone and overlaps the tail and feet. The upper shell, or carapace (KARE-a-pays), is flat and often round. The turtles also have a tube-like snout and a long neck that they can pull in or extend out. Their webbed front feet each have three claws. A few species have flap-like hinges on the lower shell, or plastron (PLAS-trun), below the hind legs. Softshell turtles can be big or small, depending on the species. The smallest has a carapace that only measures up to 5 inches (12 centimeters) long, while the largest has a carapace ten times that length and sometimes more. In addition, most of them have a one-color carapace, but a few have stripes or spots. Sometimes, young turtles are more colorful. Usually, the males have longer tails than the females do. In some species, the males are smaller than the females, and/or more colorful.

GEOGRAPHIC RANGE

Members of this family live in North America, Africa, and Asia.

HABITAT

These water-loving turtles live in all types of year-round fresh water, occasionally in ponds that dry up for part of the year. A few can swim into somewhat salty water for a brief time, but only one species, the Asian giant softshell, actually lives in the

phylum

class

subclass

order

monotypic order

suborder

▲ **family**



FLAPS FOR PROTECTION

Some species of softshell turtles have flaps near the hind legs that they can use to shield themselves from the glaring sun during dry spells. One species, called the Indian flapshell turtle, buries itself in the mud, pulls its legs inside its shell, covers up the hind legs with the flaps, and stays inside the shell in a state of deep sleep until the rains come. This period of deep sleep, which can last up to 160 days in this turtle, is called estivation (es-tih-VAY-shun). Estivation is similar to the inactive period known as hibernation (high-bur-NAY-shun), but hibernation occurs over the wintertime.

saltier waters of the coast. Overall, members of this family live east of the Rocky Mountains in North America and in mainly warmer climates in northern Africa, southern Asia, and the Indo-Australian archipelago, which is near Australia. They have also been introduced elsewhere, including Hawaii.

DIET

Most of these turtles are almost completely meat-eaters, and they eat anything they happen to come across, whether it is alive or dead. Once in a while, they will eat plants. A few species hunt by ambush, which means that the softshell turtle waits in hiding underwater — usually buried just under the bottom — for a fish or other water-living animal to swim by and then juts out its long neck and quickly grabs it with its mouth.

BEHAVIOR AND REPRODUCTION

For the most part, these turtles remain hidden for much of the day. They fall to the bottom of the lake, pond, or other watering hole where they live and wiggle their bodies back and forth until they are buried. When they move about in the water, they are excellent swimmers. Many species sunbathe, or bask, to warm their bodies. Some spend several hours a day basking on logs that stick up out of the water or on the shoreline, but they typically dash back into the water at even the slightest disturbance. Some prefer to sunbathe by simply floating in the top layer of water. They can breathe through the nose, but they can also get oxygen directly from the water, so they can stay below the surface for long periods of time. Those that live in colder areas enter a state of deep sleep, or hibernation (high-bur-NAY-shun), in the winter. During this period, which may last several months, they bury themselves in the sand or mud at the water bottom to wait for spring and warmer temperatures to come.

Softshell turtles usually mate each spring, although females can actually mate one year and have young from that single mating for several years. In some species, the male attracts the female by rubbing his chin on her carapace and bobbing his

head at her. The female lays her round eggs in sandy, dry spots on shore. Depending on the species, a female may lay three to one hundred eggs at a time and have more than one clutch a year. The nests contain both male and female hatchlings, regardless of the nest temperature. In many other turtles, nest temperature controls the number of eggs that become male or female, but this is not known to occur in softshell turtles.

SOFTSHELL TURTLES AND PEOPLE

People hunt softshell turtles for food and to make traditional medicines. While many countries now have laws to protect at least some species, illegal hunting continues.

CONSERVATION STATUS

According to the World Conservation Union (IUCN), more than half of the family's 25 species are at risk. Five species are Critically Endangered, which means that they are facing an extremely high risk of extinction in the wild. In addition, five are Endangered and face a very high risk of extinction in the wild, and six are Vulnerable and at high risk of extinction in the wild. The U.S. Fish and Wildlife Service also lists four non-U.S. species as Endangered, or in danger of extinction throughout all or a significant portion of their range. Softshells are coping with overhunting, polluted waters that can weaken and/or kill the animals, and loss of their habitat.

SPECIES ACCOUNT



SPINY SOFTSHELL *Apalone spinifera*

Physical characteristics: Also known as a gooseneck turtle or leatherback turtle, the spiny softshell is a medium-sized turtle with a long neck and a rubbery upper shell, or carapace, with tiny spines at the front edge. Its flat carapace is mostly brownish green, but it has black spots and circles in both males and young turtles. The plastron is white or yellowish white. The turtles also have webbed feet, greenish legs usually mottled with black, and typically two yellow stripes on each side of the head. The carapace in females, which are about twice as large as the males, can reach up to 18.9 inches (48 centimeters) in length.

Geographic range: They live in Mexico, the United States, and Canada.



*The spiny softshell is also known as a gooseneck turtle or leatherback turtle.
(©Steve & Dave Maslowski/Photo Researchers, Inc. Reproduced by permission.)*

Habitat: Spiny softshells live in year-round, sandy- or muddy-bottomed bodies of fresh water, such as large lakes and ponds, as well as in shallow rivers and streams. They live in northeastern Mexico, the eastern half of the United States plus a few spots in western states, and into southeastern Canada.

Diet: Spiny softshells mostly eat meat in the form of just about anything they can find, including crayfish, fishes, and insects that live in the water. They will also eat acorns and leaves.

Behavior and reproduction: This turtle will bask on shore, but it quickly retreats at the slightest movement, so people rarely see them. Larger turtles especially also bask in the upper level of water. Usually, however, this turtle spends the majority of its days buried in the muddy or sandy bottom of its watery home. From this well-hidden spot, a turtle can keep an eye out for passing fishes or insects and dart out its long neck to grab the unsuspecting animal with its jaws for a quick meal. Because it can get oxygen directly from the water,

the spiny softshell can stay underwater for long periods without drowning. Those that live in colder areas hibernate from fall to spring by burying themselves in the mud or sand beneath the water and remaining inactive.

Spiny softshells mate in the spring in deep waters. Scientists know little about their courtship or mating behaviors. In June and July, the female crawls on shore and then quickly digs a hole, drops the eggs inside, and covers it up. She provides no additional care for the eggs or the young turtles. She may lay two clutches a year. Each clutch contains four to thirty-two round eggs, each of which measures about 1.1 inches (2.8 centimeters) in diameter. They hatch in about fifty-five to eighty-five days. When the males reach four to five years old and the females reach eight to ten years old, they are ready to mate and become parents themselves. They live to be fifty years old or more.

Spiny softshells and people: People hunt this turtle for food, either to eat themselves or to ship overseas to meat markets in Asia. Some people also collect spiny softshells for the pet trade.

Conservation status: This species is not listed as endangered or threatened, although many of its nests are destroyed each year by raccoons and other animals that eat the eggs. ■

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CROCODILES, ALLIGATORS, CAIMANS, AND GHARIALS

Crocodylia

Class: Reptilia

Order: Crocodylia

Number of families: 3 families

order

CHAPTER

PHYSICAL CHARACTERISTICS

The order Crocodylia, also known as the crocodilians, includes 23 species of the most feared and most fascinating animals on the planet. They include 14 species of crocodiles and false gharials in the family Crocodylidae; eight species of alligators and caimans in the family Alligatoridae; and one species of gharial (GUR-ee-ul) in the family Gavialidae.

The crocodilians look somewhat like large lizards, but with thick and scaly skin, exceptionally strong tails, and large teeth-filled jaws. The scales on the upper surface, including the back and top of the tail, are large and rectangular in shape and have bony plates, called osteoderms (OSS-tee-oh-durms), just under the surface. Rows of these scales, which often have knobs or ridges, run from the rear of the head to the tail. On the legs and the sides of the body, the scales are smaller. Belly scales, which may also contain osteoderms, are large and smooth. Crocodilian tails are usually about as long as or a bit longer than the body, and in some species, like the Nile crocodile, the tails have a tall ridge of scales down the center.

The jaws contain large teeth, many of which show outside the mouth even when it is closed. People often describe the “grin” of a crocodilian. Of course, the animals are not actually smiling, but a slight upturn in the back of the jaw line of most species makes them look as if they are. Most, but not all, crocodilians have wide jaws. The Indian gharial is one species without a wide jaw. Instead, it has a very long and exceptionally thin pair of jaws filled with razor-sharp teeth. The false gharial, which

phylum

class

subclass

● **order**

monotypic order

suborder

family

looks much like an Indian gharial, has jaws that are only slightly wider and shorter than those of the Indian gharial.

The crocodilian body comes in shades of brown or gray, sometimes with a greenish or reddish tint. The upper surface is typically much darker than the belly, which is usually white to yellow. Bellies of dwarf caimans and dwarf crocodiles, however, are almost black. Many species have patterns of dark brown to black bands or blotches on the back and tail, and often these are most noticeable in youngsters.

The crocodilians are medium- to large-sized species. Cuvier's dwarf caiman is the smallest, with male adults reaching 5 feet (1.5 meters) long and females growing to 4 feet (1.2 meters) long. The largest species include the Indian gharial and the salt-water crocodile. Males of each species commonly grow to 16 feet (4.9 meters) and sometimes, although very rarely, reach 20 feet (6.1 meters). As with other crocodilians, the females are smaller overall than the males.

GEOGRAPHIC RANGE

Most members of the family Alligatoridae live in Central America, Mexico, the southeastern United States, and South America. One species, the Chinese alligator, makes its home in eastern China. The Indian gharial, the lone species in the family Gavialidae, lives in scattered places within India, Nepal, and Pakistan and rarely Bangladesh and Bhutan. The crocodiles and false gharials in the family Crocodylidae live over the largest area of the three families. At least one species lives in Africa, Asia, Australia, North America, and South America.

HABITAT

Most crocodilians live in tropical or subtropical regions. The American alligator, which can be found in the United States as far north as North Carolina, and the Chinese alligator live in the coolest climates of all the crocodilians and sometimes have to survive freezing temperatures. These two species spend the coldest parts of the year in underground burrows, in deep water, or lying in shallow water with just the nose poking above the sometimes ice-covered water surface.

Alligators, caimans, and gharials need freshwater habitat, but crocodiles and false gharials can survive in freshwater or saltwater. Crocodiles usually stay out of the open oceans, however, and instead make their homes in saltwater marshes or creeks.

None of the crocodilians stray very far from the water. The gharials are perhaps most tied to the water. They spend their entire lives either in or within a few feet of the water.

DIET

Crocodilians are meat-eaters, or carnivores (KAR-nih-voars), and most are not picky about their prey. Youngsters usually eat insects, spiders, and other invertebrates (in-VER-teh-brehts), or animals without backbones, as well fishes and other small vertebrates (VER-teh-brehts), which are animals with backbones. As they grow older, they begin taking larger and larger prey. The typical adult crocodilian eats everything from clams to frogs, and birds to mammals. Some, such as the Indian gharial, have jaws that are well-suited to catching fish, and they stick to a mainly fish diet. At the end of its thin jaw, the gharial has a number of very sharp teeth that jut out almost sideways in a pincushion fashion. To catch a fish, the gharial lies still, waits for a fish to come close, and then swishes its jaw sideways to skewer the fish on its teeth. With a flick of its head, the gharial tosses the fish off its teeth and down its throat.

Other crocodiles also use the sit-and-wait style of hunting, which is known as ambush hunting. Alligators and caimans also often stalk (stawk) their prey by swimming up ever so slowly, and then chomping on the surprised animal. Many crocodilians kill especially large prey by clamping on the animal and dragging it underwater to drown. They then bite off pieces to swallow. Sometimes, crocodilians work together when eating. Nile crocodiles, for example, will take turns holding onto a large prey animal while others wrap their jaws around part of the body and twist around to tear off pieces of flesh. For smaller prey, however, a crocodilian will simply swallow it whole. Crocodilian stomachs can digest almost anything, except items like hair, nails or claws, and turtle shells. Just as a cat coughs up hairballs, the crocodilian coughs up balls of this undigested material and spits them out.



A FOSSIL GIANT

About 110 million years ago, a massive beast roamed the waters of Earth. The head of this creature, an ancient relative of modern-day crocodilians, was 5 feet (1.5 meters) long, and its body grew to a whopping 39 feet (12 meters). A team of scientists found the remains of five of the animals, named *Sarcosuchus imperator* or “emperor of the flesh-eating crocodiles,” in 2000. From the fossil skulls, they determined that its diet consisted of large animals, which it hunted by ambush.



A SENSITIVE SIDE

Scientists in 2002 discovered that crocodilians use tiny dots on the skin of their faces to feel even the slightest of ripples in the water. These dots, called pressure receptors, can even feel the ripple made by a single raindrop. This ability helps to make them exceptional night hunters. They can feel even small waves made by prey animals as they move through the water.

BEHAVIOR AND REPRODUCTION

Crocodilians are often night hunters and rest or sunbathe during the day. Unlike mammals that use their own energy to keep their bodies warm, crocodilians and other reptiles get their heat from their environment. One of the best ways to warm up is by sunbathing, also known as basking. Crocodilians may bask on dry land or along or just below the surface of the water. Some crocodilians, like gharials, are very careful when they bask on shore and will quickly retreat to the water if they feel the least bit nervous. Others, such as some large American alligators, will continue to bask even if approached quite closely. At a moment's notice, however, this peaceful-looking reptile can spring into action with a swipe of its powerful tail or a

snap of its dangerous jaws. Most crocodilians are also quite fast and are actually able to outrun a person over a short distance.

Crocodilians move in several ways. All are excellent swimmers, usually gliding through the water by simply swaying the tail from side to side. Their tails are even strong enough to shoot their bodies several feet straight up and out of the water. On land, they often walk slowly, dragging the belly and tail on the ground. If they want, however, most can do a "high walk," in which they lift up the body to walk much as a lizard does.

Many species live together in groups and get along well for most of the year. During breeding season, however, the males get into arguments, wrestling matches, and sometimes more violent fights. They may bellow back and forth, push one another with their snouts, or bite each other. In some species, males try to attract the females by bellowing, or by rippling their back muscles so that water ripples over their scales. After mating, which occurs in the water, the females of all species lay their eggs out of the water. Some scrape leaves and often mud into a pile and lay their eggs in the pile, and others dig a hole as their nest. Depending on the species, a female may lay fewer than a dozen or many dozen eggs. As in some other reptiles, the temperature of the nest may control the sex of the young. In crocodilians, for example, a nest that is between 87.8 to 89.6°F (31 to 32°C) during a critical time not long before hatching produces mainly

males, while an especially high or particularly low temperature during this period produces mainly females. The mother typically remains close by as the eggs develop, often chasing off raccoons or other animals that would dig up her nest and eat her eggs if given the chance.

When the eggs hatch, the mother helps her babies out of the nest and often to the water. Despite her toothy jaws, the mother can safely carry her babies either one or several at a time in her mouth. The young usually stay with their mother, and occasionally both parents, for a while. In most species, the young remain with the family for a few weeks or months, but in the American alligator, they may stay together for as long as two years. During this time, the female may provide protection to her young, may call to them when she finds food, or in some species, may actually chew a prey animal a bit, which helps her young tear off pieces to eat.

CROCODILIANS AND PEOPLE

Crocodilians, which are sometimes hunted for their meat or skin, are perhaps best known as human killers. Death by this reptile, however, is very rare among people who act carefully and responsibly when they are in crocodilian habitat. As people move closer and closer to their habitat, crocodilians may make their presence known by plopping into a swimming pool or eating a family pet.

CONSERVATION STATUS

According to the World Conservation Union (IUCN), almost one-third of the 23 crocodilian species are either Critically Endangered or Endangered. Critically Endangered species are those that face an extremely high risk of extinction in the wild, while Endangered species face a very high risk. The other 16 species are currently doing quite well, thanks to numerous recovery efforts and anti-hunting regulations that have saved them from the brink of extinction.

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GHARIAL

Gavialidae

Class: Reptilia

Order: Crocodylia

Family: Gavialidae

One species: Gharial
(*Gavialis gangeticus*)

family

CHAPTER

phylum

class

subclass

order

monotypic order

suborder

▲ family

PHYSICAL CHARACTERISTICS

The lone species of gharial (GAR-ee-ul), also sometimes known as a gavial, looks much like a crocodile or alligator except that a gharial has an extremely long and thin snout. The narrow jaws in both males and females are lined with more than 100 pinpoint-sharp teeth. The back of a gharial is covered with tough scales, but these scales are not lumpy as they are in many alligator and crocodile species. Gharial scales are very smooth. Adults are dark brown or greenish brown on top and yellowish white to white below. Young gharials have dark bands on the body and tail. Adults also have bands, but they fade and become less noticeable as the animal gets older. The name gharial comes from the round knob that forms on the tip of the adult male's snout above the nostrils. This knob is called a ghara, because it looks somewhat like an Indian pot of the same name.

Gharials are large reptiles. Males usually grow to 13 to 15 feet (4 to 4.5 meters) long and 350 to 400 pounds (181 kilograms), although some can reach nearly 20 feet (6.1 meters). Females are a bit smaller, usually reaching 11.5 to 13 feet (3.5 to 4 meters) in length. They have long and powerful tails. They are so strong that the gharial need only sway its tail side to side to glide through the water. While swimming, it usually holds its legs back and alongside the body and does not move them.

People sometimes confuse the gharial with the false gharial. Both are large animals with a similar shape. The false gharial, also known as the Malayan gharial, has a long and thin snout, but it is not quite as long and thin as that of the true gharial.

The false gharial also has a heavier-set body. The false gharial is usually placed in the crocodile family, but a 2003 comparison of its DNA now suggests that it should be considered part of the gharial family. Every cell in the body contains DNA, which provides the instructions for making a specific species of animal. Scientists compare the DNA in different species, such as the false gharial and the gharial, to help them decide which animals are most closely related.

GEOGRAPHIC RANGE

Gharial populations are scattered here and there in India, Nepal, and Pakistan, and individuals are sometimes spotted in Bangladesh and Bhutan.

HABITAT

Gharials live in clear, freshwater rivers with swift currents but prefer river bends and other areas where the water is flowing more slowly and is quite deep. They also seek out sandbars in the middle of the river and use them for sunbathing, or basking, to warm their bodies. Strangely, this freshwater animal has salt glands, which are found in animals that live in saltwater. The glands are small organs that get rid of extra salt. Scientists suspect that the gharial once—perhaps millions of years ago—could survive in saltwater and may have traveled across the oceans.

DIET

As youngsters, gharials eat tadpoles, shrimp, insects, and fish they find in the water. As they get older, they become more selective and will eat almost nothing but fish. They usually hunt by ambush, which means that they remain completely still and wait for a fish to swim close. At that point, their unusual teeth become useful. At the front of the lower jaw, a gharial's teeth face outward at such an angle that the tip of the mouth when it is closed looks like a pin cushion. As the fish nears, the gharial snaps its jaws sideways at the prey and stabs it with these very sharp teeth. With an upward jerk of its head, the reptile flings the fish off of its teeth and into the back of its mouth.



MORE THAN A LUMPY NOSE

Scientists have long wondered about the round growth that appears on the nose of male gharials when they become adults. Many suspect that the growth, called a ghara, may do more than allow the animal to make its unusual buzzing sounds. Some researchers believe that the ghara helps the male to produce bubbles. Both the buzzing and the bubbles may help the males attract females during the mating season. Other scientists guess that the gharials look for the ghara to tell quickly which individuals are males and which are females.

BEHAVIOR AND REPRODUCTION

Like some of the other alligators and crocodiles, gharials usually get along quite well and live together in groups. They stay in the water most of the time, coming out occasionally to bask on shore. While they are excellent swimmers, they are slow on land and must drag their bellies and tails on the ground when they walk. They rarely wander too far from the water's edge and, at the slightest threat, will dive back into the safety of the river. On especially warm days, they may open their mouths wide to cool off. This serves the same purpose as panting does for a dog.

When mating season arrives in December and January, the adult males begin fighting one another to set up and defend territories in shallow water. Their fights look something like wrestling matches. Two males lie side by side, lift their heads out of the water, and begin pushing each other with their snouts. The winner is the one that can topple over the other. Sometimes, the wrestling matches become more violent, and the two males hit each other with their snouts or bite each other. A male with a good territory may be able to attract several large females to mate with him. Scientists also believe that the size of the male's ghara may also be important during the mating season. The males can use the ghara to produce a loud buzz, which may be attractive to females. Males also will buzz to warn other males to stay away.

After mating, a female will lay her eggs sometime from March to May. She crawls up a steep bank at the riverside and begins looking for a spot for her nest. She digs her nest in dry ground at least 5 feet (1.5 meters) above water level. A female gharial is very fussy about her nest and may change her mind several times, even after starting to dig, before settling on the perfect place to lay her eggs. The female becomes territorial and guards her specific nest sites from other females, although she will share the beach with many other females and their nests. After digging a hole in the sand, she lays her eggs inside and carefully covers them. The smallest females lay as few as a dozen eggs, and many first-time mothers lay eggs that never hatch at all. The largest females, on the other hand, may lay almost 100 eggs. A typical gharial egg is 2.2 inches (5.5 centimeters) wide, 3.4 inches (8.6 centimeters) long, and weighs 5.5 ounces (156 grams). Females remain near their nests and will defend them from predators, if necessary. The eggs hatch 53 to 92 days later, with nests in warmest climates hatching out earliest and babies



Scientists suspect that the gharial once — perhaps millions of years ago — could survive in saltwater and may have traveled across the oceans. (Derek Hall/FLPA/Bruce Coleman Inc. Reproduced by permission.)

in the coolest areas breaking out of their eggs last. The temperature of the nest also controls the number of males and females. Especially warm nests produce more males, and cooler ones produce more females.

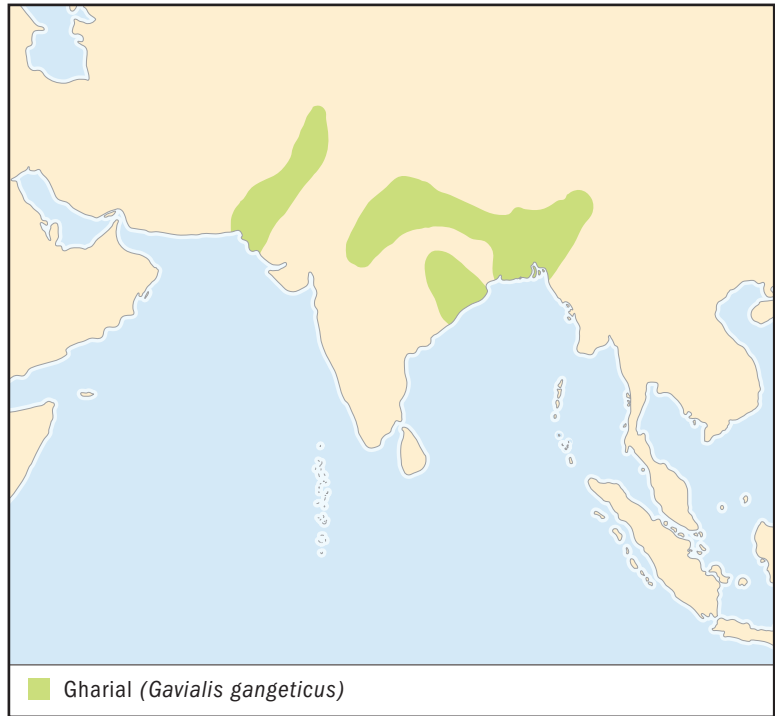
The mother gharial helps her young out of the nest, and then she and possibly the father watch over them. Despite this care, many of a female's young do not survive. Numerous animals, including pigs, hyenas, monitor lizards, and some humans, are fond of gharial eggs, while some birds and turtles often gobble up babies. In addition, the babies are born during the monsoon season and often drown in the floods that are common at this time of year. Of those that do survive, the females are ready to mate when they reach about 10 feet (3 meters) long and are at least 8 years old. The males can mate once they are 15 years old and about 11.5 feet (3.5 meters) long.

GHARIALS AND PEOPLE

Local people sometimes gather gharial eggs for food or hunt the males for the ghara, which they use to make potions. Some people fear gharials, but they do not attack or eat humans. This reptile does, however, hold a place in Hindu legends of a river goddess, named Ma Ganga, who rides on a gharial's back.

CONSERVATION STATUS

The World Conservation Union (IUCN) and the U.S. Fish and Wildlife Service consider this species to be Endangered,



which means that it faces a very high risk of extinction in the wild and throughout all or a significant portion of its range. In some areas, the gharial has already disappeared or is nearly gone. The greatest threat to this species is habitat loss, often caused when people clear land for farming or for firewood. Conservationists have raised and attempted to release young gharials into the wild. Some of these efforts have been successful, and others have not, but the work to save this unusual species is continuing.

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ALLIGATORS AND CAIMANS

Alligatoridae

Class: Reptilia

Order: Crocodylia

Suborder: Eusuchia

Family: Alligatoridae

Number of species: 8 species

family

CHAPTER

phylum

class

subclass

order

monotypic order

suborder

▲ family

PHYSICAL CHARACTERISTICS

Like crocodiles, the alligators and caimans have a heavy body, with the back and tail covered by armor-like scales. Crocodiles, alligators, and caimans have a strong tail, which is at least as long as the rest of the body, and the back half of the tail often has a row of tall, ridged scales along the top. They also have a long snout, hind limbs larger than the front legs, and large, powerful jaws filled with teeth. Alligators and crocodiles are, however, different. All of an alligator's or caiman's lower teeth are hidden when its mouth is closed. In crocodiles, one lower tooth remains outside the jaw, even when it is clamped shut.

When alligators are young, they often have dark bands on their bodies, but these disappear as they get older. Adults may be dark gray, brown, black, or a bit yellowish. The smallest species is Cuvier's dwarf caiman, which grows to about 4 feet (1.2 meters). The largest is the American alligator, which can reach 13 feet (4 meters) long.

GEOGRAPHIC RANGE

Depending on the species, alligators and caimans may live in Central America, Mexico, the southeastern United States, South America, and/or eastern China.

HABITAT

Alligators and caimans are freshwater species that prefer still or slow-moving water, even if it is muddy or murky. Besides lakes, rivers, and streams, they are often found in swamps,

marshes, and roadside ditches. Seven of the eight species live in the New World, which includes Central, South, and North America, but only one lives in the United States. The eighth species makes its home in a small area of eastern China, which is part of the Old World.

DIET

Alligators are meat-eaters, though they are anything but fussy about their prey. Youngsters will dine on snails and other invertebrates (in-VER-teh-brehts), which are animals without backbones. As they grow, they switch to the adult diet, which includes fishes, birds, small mammals, and other vertebrates (VER-teh-brehts), which are animals with backbones. They will also sometimes attack and devour smaller alligators and caimans. The larger species in this family are strong enough to kill a cow or deer for dinner.

Alligators hunt by ambush or by stalking. In ambush hunting, they remain still and wait for a prey animal to wander by. Stalking is usually done in the water. The alligator slowly and carefully swims closer and closer to a prey animal, perhaps a deer drinking at a watering hole, and then lunges forward to snap its jaws shut around the animal.

BEHAVIOR AND REPRODUCTION

A favorite daytime activity for alligators and caimans is sunbathing, or basking, on shore. They can also heat up their bodies by floating in the warm, upper surface of the water. When they need to cool off, they simply sink to colder, deeper water. Some live where the weather is especially cold at times during the year, but none of them actually hibernate (HIGH-bur-nayt), or become inactive and enter a state of deep sleep. Instead, these species either lie still in shallow water and breathe through the nose, the only part of the body not underwater, or they retreat into winter burrows to wait for spring.



A LONG WINTER

The Chinese alligator has only a short time to mate, have babies, and eat enough to survive the year. The reason is the climate in which it lives. Chinese alligators make their home in the Yangtze River basin along China's central Atlantic coastline, an area that is cold much of the year. When temperatures drop in the late fall, the alligators slide into their winter burrows and stay there until the following April. They then crawl out to soak up the sun and warm their bodies. About a month later, the males begin to bellow, which starts the mating season. Females lay their eggs, which usually hatch in September, not long before the temperatures again cool and announce the coming of another long winter period in their burrows.

Alligators and caimans appear very restful when they are basking, but they are actually quite alert. With a quick swipe of the tail, a swift turn of the head with jaws open, or a speedy charge on their powerful legs, they can change from a quiet, peaceful-looking reptile to a dangerous predator. Alligators and caimans can move in several ways. In the water, they usually swim by slowly swaying the tail from side to side. On land, they may crawl along with the belly and tail dragging on the ground, or they can do a “high walk” and run as a lizard does with the body held above the ground.

Alligators and caimans often live in groups. They get along well during most of the year, but during the spring breeding season, the rules change. Adults begin slapping their heads on the water surface or charging one another with their mouths wide open, although they do not normally bite. By summer, the females begin to scrape together piles of leaves on which they lay their 12 to 60 eggs. The mother remains nearby, and when the babies hatch one or two months later, she helps them out of the nest and to the water. In some species, the temperature of the nest decides the sex of the babies. Cool temperatures produce all females, and warm temperatures produce all males. Temperatures in the middle turn out males and females.

ALLIGATORS, CAIMANS, AND PEOPLE

People sometimes hunt alligators and caimans for their skin, their meat, and sometimes for their organs, which are used to make perfume. In Florida, Louisiana, and other places, they are an important tourist attraction and help bring in money to the local community.

CONSERVATION STATUS

The World Conservation Union (IUCN) considers the Chinese alligator to be Critically Endangered, which means that it faces an extremely high risk of extinction in the wild. It also lists the black caiman as Conservation Dependent, which means it still requires attention to make sure it survives. The U.S. Fish and Wildlife Service lists the American alligator, a U.S. species, as Threatened, or likely to become endangered in the foreseeable future. These and other alligators and caimans often suffer from habitat loss and overhunting, and numerous conservation efforts are under way to protect them.



AMERICAN ALLIGATOR

Alligator mississippiensis

SPECIES ACCOUNTS

Physical characteristics: A large reptile, the American alligator has a black or dark grayish green back and tail with a white belly. Young alligators have numerous yellow markings on the back and tail. American alligators are sometimes confused with American crocodiles, but the crocodile has a snout that becomes thinner at the tip. The alligator's snout remains wide. Adult American alligators usually grow to 8 to 13 feet (2.4 to 4 meters) long, but some giants may reach 19 feet (5.8 meters) or more.

Geographic range: American alligators live in the United States from North Carolina down to Florida and west to Texas.

Habitat: American alligators make their homes in still or slow-moving freshwater areas, including marshes and swamps, rivers, and lakes.



American alligators are sometimes confused with American crocodiles, but the crocodile has a snout that becomes thinner at the tip. The alligator's snout remains wide. (Illustration by Brian Cressman. Reproduced by permission.)

Occasionally, they make their way into the swimming pools of people who live near their natural habitat.

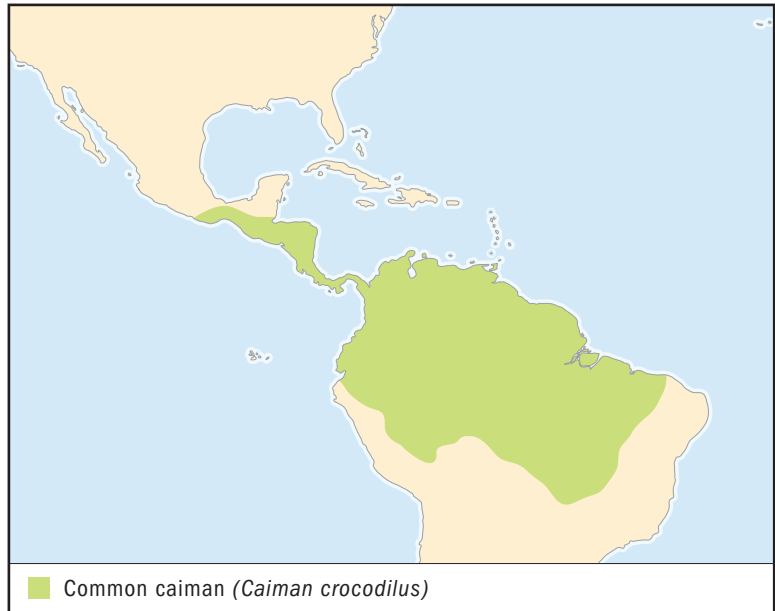
Diet: Meat-eaters, they will dine on almost any animal they come across, including turtles, fishes, mammals, and sometimes smaller alligators. They swallow most smaller prey whole. For larger animals, however, the alligators first drown the victim, then chomp off mouthfuls of flesh.

Behavior and reproduction: American alligators live in groups, with great grandparents, grandparents, parents, and children often sharing the same area. During the spring breeding season, the males try to interest the females by bumping softly against them and calling out with loud bellows. The females bellow, too, but much less often and not quite as loudly. After mating, the female lays 36 to 48 eggs, which hatch about two months later. She helps the young out of the nest and to the water. The family stays together for two or three months, and sometimes up to three years. The young alligators are ready to become parents themselves when they reach about 10 years old. American alligators live to be 50 years old or older.

American alligators and people: In many areas, people like alligators because they bring money to the community through tourism, but at the same time dislike them because the reptiles sometimes eat pets or have to be removed from golf courses and swimming pools. Now that people have begun to move farther and farther into the alligators'

habitat, attacks on humans have also become much more common. According to the Florida Fish and Wildlife Conservation Commission, alligator attacks on humans in that state from 1948 to 2003 numbered 326 and resulted in 13 deaths.

Conservation status: The World Conservation Union (IUCN) does not consider this species to be at risk, but the U.S. Fish and Wildlife Service lists it as Threatened or likely to become endangered in the foreseeable future. ■



COMMON CAIMAN

Caiman crocodilus

Physical characteristics: Also known as the spectacled caiman, the common caiman has a bony ridge and slightly lighter color around each eye. Its body is greenish to brownish gray, sometimes with noticeable dark bands on its tail and patches on its back. Adults usually grow to 4 to 6 feet (1.2 to 1.8 meters) long, but some can reach up to 10 feet (3 meters) from the tip of the snout to the end of the tail.

Geographic range: The common caiman lives from southern Mexico to northern Argentina, on the islands of Trinidad and Tobago, and in southern Florida. Cuba and Puerto Rico also have introduced populations.

Habitat: It is found in calm freshwater lakes, rivers, and swamps, as well as man-made roadside ditches.

Diet: From youngsters to adults, common caimans tend to eat animals they find in the water. Although the youngest ones will eat insects and other invertebrates they find on land, juveniles are fond of snails, and adults mainly eat different types of fishes.



Common caimans live in groups quite peacefully for most of the year, but during the mating season, the males begin bellowing and set up territories. (©Kevin Schafer/Photo Researchers, Inc. Reproduced by permission.)

Behavior and reproduction: Common caimans live in groups quite peacefully for most of the year, but during the mating season, the males begin bellowing and set up territories. One male may mate with several females. The female lays 12 to 36 eggs in a leafy nest she makes on land. The male guards the nest until the babies hatch. The mother then carries them to the water. The family stays together for about a year.

Common caimans and people: People sometimes hunt this reptile for its meat and its skin.

Conservation status: This species is not considered endangered or threatened. ■

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family CHAPTER

CROCODILES AND FALSE GHARIALS Crocodylidae

Class: Reptilia
Order: Crocodylia
Family: Crocodylidae
Number of species: 14 species

PHYSICAL CHARACTERISTICS

Fourteen species of crocodiles make up this family, including one called a false gharial. (An Indian gharial also exists, but it is not a crocodile and is instead listed in its own separate family.) The crocodiles are medium to large reptiles, with adults ranging from about 5 feet (1.5 meters) long in the smallest species to 20 feet (6.1 meters) long in the largest. Within species, females are smaller overall. For example, female Johnstone's crocodiles typically grow to 5 feet (1.5 meters), while the average male is about 6.5 feet (2 meters) long. In all species, the tail is about as long as the rest of the body.

Crocodiles, alligators, and caimans are often confused because they all have armor-like scales on the back and tail, a powerful tail, a pair of back legs that are stronger and larger than the front pair, and toes that are webbed on the back pair of feet and unwebbed on the front pair. Perhaps most noticeably, they also all share a long snout filled with teeth. Crocodiles, however, have something the others lack. Counting from the front of the mouth, the large fourth tooth on each side of a crocodile's lower jaw shows outside of the mouth when the jaw is closed. In other species, this large tooth is hidden, although many other teeth on the upper jaw may be visible when the mouth is clamped shut.

GEOGRAPHIC RANGE

At least one species of crocodiles lives in each of these continents: Africa, Asia, Australia, North America, and South America.

phylum
class
subclass
order
monotypic order
suborder
▲ **family**

HABITAT

Crocodiles spend their time in or near the water. Unlike alligators and caimans that only live in freshwater habitats, crocodiles can survive in freshwater or saltwater. Crocodiles do not, however, swim around in the open ocean. Instead, they live in saltwater marshes or creeks. They have special organs, called salt glands, that get rid of this extra salt so they can survive. Without these organs, they could not live in saltwater. Crocodiles make their homes in warm, tropical areas, although the mugger crocodile and the American crocodile can survive in subtropical regions that are slightly less warm. Those that live in areas with periods of extremely dry weather sometimes find that their watering holes disappear, and they must spend the next few weeks buried deep underground until the rains return.

DIET

Crocodiles are meat-eaters that shift from eating insects and spiders as youngsters to larger and larger animals as they grow. Adults of the largest crocodiles, like the Nile crocodile, eat animals as big as warthogs, cows, and sometimes humans. They are skilled hunters that sneak up on prey by ever so slowly swimming closer and closer, and then lunging out with mouth open to clamp down on the surprised animal. This method of sneaking up on prey is called stalking. Once the jaw snaps shut, the prey has little chance of escaping. With a captured mammal, the crocodile typically pulls it underwater, and when the animal drowns, tears off chunks to swallow. Crocodiles also hunt for prey by ambush, which means that they stay still in the water and wait for a prey animal to happen by. Besides live meals, crocodiles will also eat the dead animals they find.

BEHAVIOR AND REPRODUCTION

Crocodiles are most active at night, which is when they usually look for food. In the morning and evening, they frequently crawl out of the water and lay quietly in an open area to sunbathe, or bask. This helps warm their bodies. Crocodiles are excellent swimmers. By slowly swishing the strong tail from side to side, they can push their bodies through the water without having to paddle with their legs. They can also move well on land. Usually, they walk slowly, dragging the tail behind them, but when they are in a hurry, they run quite quickly.

while swinging the tail back and forth in the same motion they use when swimming.

Crocodiles usually get along fairly well with one another, but during the mating season, males can become bad-tempered. Usually, a large male need only sound a loud bellow or slap his head against the surface of the water to scare off a smaller male, but sometimes they fight by biting one another. The bites are hard enough to cause wounds that leave noticeable scars. Besides their bellows, crocodiles make other sounds, such as growls and hisses, when they feel threatened.

Male crocodiles may fight each other over the females during mating season, and one male may have babies with several females in a single year. All female crocodiles lay eggs rather than giving birth to babies. The females in some species use their back legs to dig a hole on land, and they bury their eggs there. These females lay their eggs in the dry season, and the eggs hatch when the rains come. In other species, the females lay their eggs in a pile of rotting leaves and dirt that they scrape together. The females lay their eggs at the beginning of the rainy season, and the eggs hatch during the wettest time of year. Depending on the species, females may lay 40 to 70 eggs at a time, with hatching occurring two to three months later. If the nest is especially warm, the eggs all hatch into males. If the nest is particularly cool, the eggs all hatch into females. A mother crocodile stays close to her nest until the eggs are ready to hatch. The baby crocodiles begin to make soft quacking noises when they are ready to break out of their eggs, and the mother rushes to the nest to pick up and carry each of her babies to the water. The mother, and sometimes the father, watches over the young for several weeks, but despite this care, fewer than one out of 10 babies escapes the many predators in their habitat. Those that do survive to adulthood can look forward to a long life. Crocodiles often live for 70 to 80 years in the wild.

CROCODILES, FALSE GHARIALS, AND PEOPLE

People have long been fascinated by crocodiles, which are often mentioned in legends. Some people hunt these animals



ONE TON BEAST

The saltwater crocodile is a huge animal. The largest species of all crocodiles and alligators, it can grow to more than 20 feet (6.1 meters) long and weigh 2,200 pounds (1 metric ton). Occasionally, humans tangle with these beasts and lose. One of the most often-told tales of human versus crocodile dates back to World War II, when hundreds of Japanese soldiers hid in a swamp near Myanmar. A large group of saltwater crocodiles set upon the men that night, killing all but 20 by morning.

for their meat or skin, and some collect and eat their eggs. Crocodiles are perhaps most known, however, as killers of humans. Although death by crocodile is very rare, it does happen occasionally, especially when humans who visit their habitat are careless.

CONSERVATION STATUS

According to the World Conservation Union (IUCN), nine of the 14 species are at risk. This includes three listed as Critically Endangered, which means they face an extremely high risk of extinction in the wild; two as Endangered and facing a very high risk of extinction in the wild; three species as Vulnerable and under a high risk of extinction in the wild; and one as Conservation Dependent, which means it could be at risk if conservation efforts ceased. In addition, the IUCN describes one species as Data Deficient, which means that scientists have too little information to make a judgment about its threat of extinction. The U.S. Fish and Wildlife Service lists 12 of the 14 species as Threatened, or likely to become endangered in the foreseeable future, or Endangered, which means they are in danger of extinction throughout all or a significant portion of their range. Most of the species are at risk because of habitat loss and overhunting. Several efforts are now under way to help protect these animals.



AMERICAN CROCODILE

Crocodylus acutus

SPECIES ACCOUNTS

Physical characteristics: The American crocodile is large, with the males averaging 10 to 11 feet (3 to 3.5 meters) long and females usually 8 to 10 feet (2.5 to 3 meters) in length. The largest males, however, can reach a full 20 feet (6 meters), but such giants are extremely rare. Its body is a bit thinner than most crocodiles, and its snout becomes narrower toward the tip. It also has a noticeable lump on its snout in front of its eyes. Adults are usually dark brown to light brownish gray with a white belly. Youngsters are yellow to greenish gray with dark markings.

Geographic range: American crocodiles live in large groups in southern Florida, southern Mexico, Central America, numerous Caribbean islands, and northern South America.

American crocodiles live in large groups in southern Florida, southern Mexico, Central America, numerous Caribbean islands, and northern South America. (Lynn M. Stone/Bruce Coleman Inc. Reproduced by permission.)



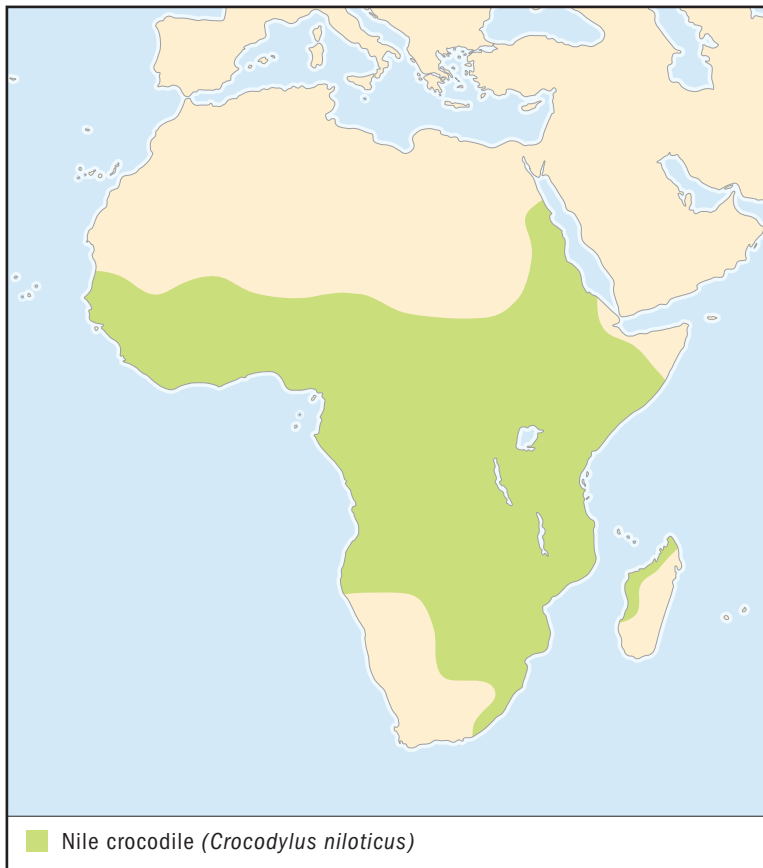
Habitat: Also known as the American saltwater crocodile, this species can survive in various habitats from freshwater canals to somewhat salty marshes near the ocean coast.

Diet: Young American crocodiles catch and eat insects, tadpoles and frogs, crabs, and fish, and then switch to larger prey as they grow. Adults are able to feed on animals as large as cows and, in very rare cases, humans.

Behavior and reproduction: American crocodiles usually hunt at night and spend most of their days resting in the water or basking or sunbathing on shore, especially in the mornings and evenings. During very dry periods, they will dig a tunnel and remain inside until the rains return. Males and females mate from March to May, and each female lays 30 to 60 eggs in a hole that she digs. Sometimes, the mother may lay her eggs in a pile of rotting leaves and dirt instead. She stays nearby until the eggs hatch 80 to 90 days later. She then helps her babies out of the nest and watches over them for a few more days.

American crocodiles and people: This species very rarely attacks humans. Some humans, however, raid the crocodiles' nests to collect their eggs for food.

Conservation status: The World Conservation Union (IUCN) considers this species to be Vulnerable, or facing a high risk of extinction in the wild. The U.S. Fish and Wildlife Service designates it as Endangered, or in danger of extinction throughout all or a significant portion of its range. The primary threat to this animal comes from habitat loss. ■



NILE CROCODILE

Crocodylus niloticus

Physical characteristics: A large and bulky-bodied species, the Nile crocodile has a very lumpy, dark brown to gray back and a light yellow, white, or gray belly. Youngsters are greenish brown to brown with dark markings. Females usually reach about 8 feet (2.5 meters) long, and males typically grow to about 11.5 feet (3.5 meters).

Geographic range: Nile crocodiles live in Africa south of the Sahara Desert and on Madagascar off Africa's southeast coast.

Habitat: Nile crocodiles mainly live in freshwater habitats, including marshes, lakes, and rivers.



Nile crocodiles spend much of their time in the water, either stalking prey or lying in wait for an animal to come close enough to attack. (©Charles V. Angelo/The National Audubon Society Collection/Photo Researchers, Inc. Reproduced by permission.)

Diet: The adult diet is mostly fish, although Nile crocodiles will also eat large mammals, such as warthogs and antelopes.

Behavior and reproduction: Nile crocodiles spend much of their time in the water, either stalking prey or lying in wait for an animal to come close enough to attack. With their powerful jaws, they can clamp onto even large animals and drag them underwater. After the animal drowns, the crocodile may twirl the animal in the water in an attempt to tear off a chunk of flesh to eat. Nile crocodiles often live in large groups and often bask together on the shoreline. During the August-to-January mating season, however, males will fight one another. After a male and female mate, the female goes off to dig a hole high on shore and lay her 50 to 80 eggs inside. The mother remains nearby, and 80 to 90 days later, she helps her now-hatched young out of the nest and to the water. The young stay under their mother's watchful eye for another month or so, and then go off on their own.

Nile crocodiles and people: These animals occasionally attack and kill ranchers' cattle and other livestock, and very rarely, a person. Some people hunt this reptile for its meat and skin.

Conservation status: Although it was once overhunted, the World Conservation Union (IUCN) no longer considers this species to be at

risk. The U.S. Fish and Wildlife Service, however, lists it as Threatened, or likely to become endangered in the foreseeable future. Numerous guidelines are in place to help make sure the crocodile survives into the future. ■

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TUATARA

Sphenodontidae

Class: Reptilia

Order: Sphenodontia

Family: Sphenodontidae

Number of species: 2 species



monotypic order

CHAPTER

phylum

class

subclass

order

● **monotypic order**

suborder

family

PHYSICAL CHARACTERISTICS

At a glance, each of the two species of tuatara could be mistaken for a lizard. A closer look, however, reveals how different they really are. One difference is in their teeth. Tuataras have not one, but two rows of teeth lying side by side in the upper jaw. When the mouth closes, the single row of teeth in the lower jaw fits between the two upper rows. Tuataras have ears as lizards do, but lizards have an ear opening on each side of the head and tuataras do not. Baby tuataras have another unusual feature. They have a pale patch on the top of the head, which some people have called a “third eye.” The patch becomes covered with scales as the animal grows up. Scientists are unsure of the patch’s purpose but believe it may allow the reptile to see light from the sun. Such information about the sun’s location may help the animal find its way.

A tuatara has a large head on a sturdy body that ends in a thick tail. Its skin is wrinkly and covered with noticeable beady scales. A white crest runs along the back of the head and down the middle of the back. The tail also has a row of toothy spines down its center. Males are larger and heavier than females, and they also have larger crests on the head and back. The biggest of the two species, the northern tuatara, can grow to more than 24 inches (61 centimeters) long from head to tail and weigh at least 2 pounds (1 kilogram). The smaller females of the species usually reach 16 inches (40.6 centimeters) and 1 pound (0.5 kilograms) at most. The other species, known as Brother Islands tuatara, is slightly smaller.

The Brother Islands tuatara is often a bit greener in color than the greenish brown northern tuatara, but both are sometimes reddish to almost black in color. The two species have white and black blotches and spots, but the Brother Islands tuatara usually has more white spots. Young tuataras of both species are commonly light grayish brown with light V-shaped patterns running along the back and dark markings by the eyes.

GEOGRAPHIC RANGE

Tuataras have a small range, living on about 30 tiny and hard-to-reach islands off New Zealand's shore.

HABITAT

Although neither species is widespread, the northern tuataras make their homes over a bigger area than the Brother Islands tuataras. The northern tuataras live on 26 islands off northeastern North Island and on four islands of Cook Strait off the northern coast of South Island. The Brother Islands tuatara lives only on North Brother Island in Cook Strait. Both species are burrowers and live in shady forests where the trees grow thick enough to block the sun almost completely from reaching the ground.

DIET

Usually active at night, the tuataras often hunt by ambush, which means that they sit still and wait for a prey animal to come to them. They also forage (FOR-ej), which means that they wander about looking for food. They use their sticky fat tongues to catch and eat mainly non-flying grasshoppers, beetles, and other crawling invertebrates (in-VER-teh-brehts), which are animals without backbones. The unusual arrangement of their teeth is not only excellent for crushing invertebrates but is also well-suited to the occasional meal of a seabird, lizard, or perhaps a smaller tuatara. The younger tuataras are more likely than the adults to hunt during the daytime. This practice may help them avoid being eaten by adult tuataras.

BEHAVIOR AND REPRODUCTION

Tuataras are most active at night, which is when they do the majority of their hunting. During the daytime, each one lives alone in its underground burrow, occasionally coming to the burrow entrance to sunbathe, or bask, and warm their bodies. Tuataras live on very small islands that may become rather



A VERY OLD REPTILE

The tuatara is the only descendant of an ancient group of reptiles that were common in the late Triassic and Jurassic periods about 180 to 220 million years ago. At that time, they were spread out over Europe, Africa, and North America. They started to disappear during the dinosaurs' reign, and almost all of them were completely gone by the early Cretaceous Period, which followed the Jurassic. A tiny group, however, survived on a piece of land that broke off the mainland and eventually formed the islands of New Zealand. This group of animals, called a lineage (LIN-ee-ej) because it connects species through time to their ancestors, gave rise to the two current-day tuatara species.

crowded, sometimes with tuatara burrows less than 3 feet (0.9 meters) apart. In some cases, 810 tuataras may share a single acre of land (2,000 per hectare). They get along quite well, but males will fight one another for small territories, where they hope to attract females for mating. The battles begin with two males lining up next to each other, with each facing in the opposite direction. They then puff up the throat, stiffen the crest spines on the back so they stand on end, open wide the mouth, and snap the jaws shut tight. Usually this display is enough for one of the two males to surrender and leave the area. Occasionally, however, neither one retreats, and the two males engage in biting matches.

Females mate once every two to five years, but males mate every year. Males set up their territories in summer and fall and begin doing what is called a "proud walk" to catch a female's eye. Doing some of the displays he does when battling males, he tries to attract a female by slowly strutting around her while stiffening his back crest and puffing up his throat. If she is interested, she stays. If not,

she simply walks away. After mating, a female must wait until the following spring to lay her eggs. Most lay four to 13 eggs, but the larger northern tuataras from Cook Strait often lay eight to 15. Each female makes a hole that may be very shallow or up to 20 inches (50 centimeters) deep, lays her eggs, and covers them loosely with dirt. The eggs do not hatch until 12 to 15 months later. As in many other reptiles, the temperature of the nest controls whether the eggs hatch into males or females. In the case of the Brother Islands tuatara, warmer nests produce mostly males, and cooler ones produce mostly females. Tuataras cannot mate until they are up to 13 years old. They live to be at least 60 and possibly much longer.

TUATARAS AND PEOPLE

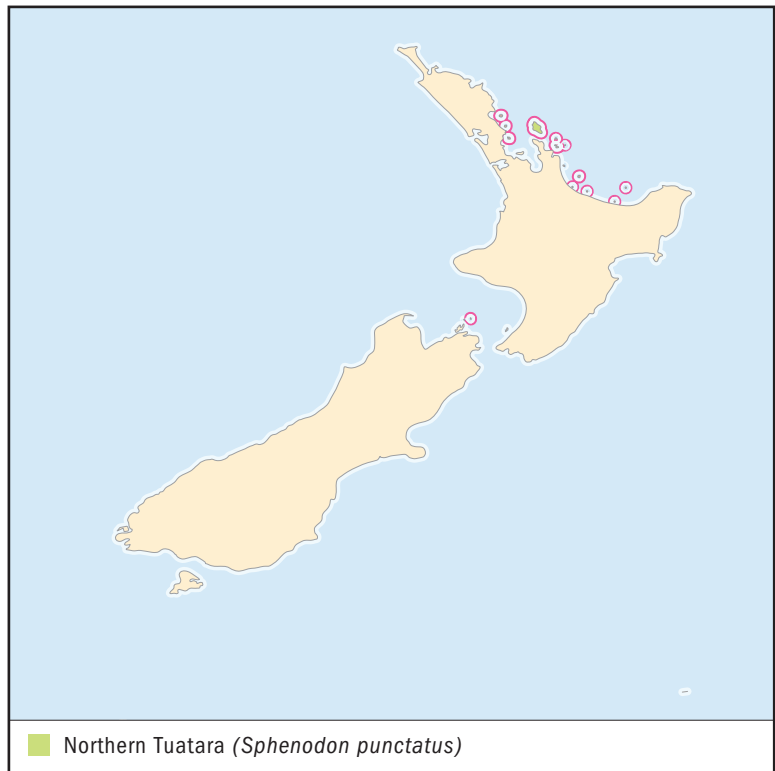
The people of New Zealand hold the tuatara in high regard and consider them to be living treasures. Tuataras have also

caught the eye of the science community. In the 1800s, for example, so many scientific institutions wanted their own tuataras to study that the local government in 1895 was forced to protect the reptile before its population dropped too low.

CONSERVATION STATUS

The World Conservation Union (IUCN) considers the Brother Islands tuatara to be Vulnerable, which means that it faces a high risk of extinction in the wild. The U.S. Fish and Wildlife Service lists both species as Endangered or in danger of extinction throughout all or a significant portion of their range. One of the greatest threats to the tuataras comes from introduced species, especially rats, which attack and kill the reptiles. Several programs are under way to remove the rats and to prevent any other predators from reaching the islands; these efforts are helping the tuataras to make a comeback. In addition, other programs are helping to return tuataras to those places where they once lived but had disappeared.

SPECIES ACCOUNT



NORTHERN TUATARA *Sphenodon punctatus*

Physical characteristics: The northern tuatara is a beady-skinned, lizard-looking animal with a crest on the back of its head and on its back. Its color may be gray, greenish gray, red, or black. Males can reach more than 24 inches (61 centimeters) long and 2 pounds (1 kilogram). Females are smaller, usually growing to no more than 16 inches (40.6 centimeters) and 1 pound (0.5 kilograms).

Geographic range: The northern tuatara lives on about 30 islands off New Zealand's coast.

Habitat: Northern tuataras spend much of their lives in or around their underground burrows.

Diet: Their diet is about 75 percent invertebrates, especially beetles and grasshoppers. They occasionally eat lizards, small birds, and other vertebrates (VER-teh-brehts), which are animals with backbones.

Behavior and reproduction: During the day, northern tuataras remain in their burrows, occasionally coming to the entrance to bask in the sun. They do most of their hunting at night. Although they get along quite well, considering that they may sometimes live less than 3 feet apart, the males do fight, especially during the breeding season. Males mate every year, but females mate only once every 2 to 5 years.

Northern Tuataras and people: Local people respect this reptile. The New Zealand government is very strict in its protection of the tuataras, even limiting travel to the islands where the reptiles live.

Conservation status: The World Conservation Union (IUCN) does not consider this species to be at risk, but the U.S. Fish and Wildlife Service considers it to be Endangered or in danger of extinction throughout all or a significant portion of its range. Efforts are under way to remove introduced predators, especially rats, from the tuatara's islands. ■

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The people of New Zealand hold the tuatara in high regard and consider them to be living treasures. (Illustration by Brian Cressman. Reproduced by permission.)

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order

CHAPTER

SNAKES AND LIZARDS

Squamata

Class: Reptilia

Order: Squamata

Number of families: About 42 families

PHYSICAL CHARACTERISTICS

The 7,200 species of snakes, lizards, and wormlizards all fall under the order Squamata and are therefore known as squamates (SKWAH-mates). Perhaps the most noticeable difference between the snakes and the lizards are the legs, or the lack of them. Most lizards, except for a few species, have working legs. Snakes are legless. The most noticeable feature of the worm lizards is their earthworm-like body. While they have scales and earthworms do not, worm lizards' scales are arranged in rings and separated with grooves to give them the appearance of an earthworm's ringed body. Most of the worm lizards are legless, although a few have two front legs just behind the head.

Besides smelling with their noses and tasting with their tongues, most squamates also smell with a special organ on the roof of their mouths. They use it by first flicking or otherwise picking up chemicals on the tongue. They then place the tongue on the roof of the mouth at what is called the Jacobson's organ, which smells the chemicals. For hearing, many lizards have ears that are visible as a hole on either side of the head. Neither the snakes nor the wormlizards have the openings for their ears. Scientists believe that snakes can probably only hear very low-pitched sounds, including ground vibrations that they sense in the jaw and send to the ear.

In addition to the presence or absence of ear holes, known as external ears, snakes and lizards have another obvious difference. The majority of lizards have eyelids that close and open. Snakes, on the other hand, have a spectacle over their

phylum

class

subclass

● **order**

monotypic order

suborder

family

eyes. A spectacle is a clear scale, which looks much like a contact lens. In other words, a lizard noticeably blinks, but a snake always appears to have its eyes open. Although most squamates have obvious eyes, those species that spend most of their lives underground often have very small eyes, which are sometimes invisible under their scales.

The size of the squamate depends on the species. Among the lizards, the heaviest is the Indonesian Komodo dragon, which can grow to be at least 9.9 feet (3 meters) long and 330 pounds (150 kilograms). Many people consider the crocodile monitor to be the world's longest lizard. It can reach 12 feet (nearly 3.7 meters) long, although some reports claim that the lizards can reach 15 to 19 feet (4.6 to 5.8 meters) long. The smallest lizard, on the other hand, is the jaragua lizard, also known as the dwarf gecko. From one end to the other, adults of this recently discovered species only reach about 1.2 inches (3.2 centimeters) long. Snakes also come in different sizes. Some of the smallest are in the blind snake and slender blind snake families, which include species that only grow to 4 inches (10 centimeters) long and weigh just 0.05 ounces (1.4 grams). This compares to the reticulated python, which often reaches 20 feet (6.1 meters) or more. The largest reticulated python ever discovered was killed in 1912 in Indonesia. This beast measured 33 feet (10.1 meters) in length. The South American green anaconda is another enormous species, often reaching 25 feet (7.7 meters) long and 300 pounds (136 kilograms). Wormlizard adults range from 3.1 inches (8 centimeters) to more than 32 inches (81 centimeters) long.

GEOGRAPHIC RANGE

Besides the Arctic, Antarctic, and other very cold places, squamates live almost the world over.

HABITAT

Squamates can live in many habitats, from the dry conditions in the desert to the wet and warm rainforests. Many of them, including numerous lizards and snakes, live above ground on land. Some, such as the wormlizards, are fossorial (foss-OR-ee-ul), which means that they remain underground most of the time. Others, including many snakes, are arboreal (ar-BOR-ee-ul), which means that they often live above the ground among tree branches. Some, like the water snakes, rarely leave their freshwater streams or ponds, while the sea kraits are snakes that spend their lives in salt water.

DIET

Most of the squamates eat other animals. Many of the lizards and the smaller snake species eat insects or other invertebrates (in-VER-teh-brehts), which are animals without backbones. Even some of the medium-sized snakes eat invertebrates. Eastern garter snakes, for example, like to dine on earthworms. A large number of the medium- to large-sized snakes, however, eat other snakes, lizards, frogs and tadpoles, mammals and other vertebrates (VER-teh-brehts), which are animals with backbones. Boa constrictors, pythons, and other very large snakes sometimes eat calves, deer, and other big mammals. Monitor lizards, which can grow to 12 feet (3.7 meters) or longer, can also capture, kill, and eat large mammals, such as deer, monkeys, wild pigs, and even buffalo. They are also known to eat dead animals, or carrion (CARE-ee-yun), that they come across. Some species of squamates eat plants either in addition to or instead of meat. Many of the iguanas, for instance, eat flowers, fruits, and leaves.

All squamates shed their skin—actually just the outer layer—once a year. If a snake eats well and grows quickly, it may shed additional times. The lizards typically shed in small pieces, while the snakes usually shed in one piece that peels off inside out. Often, a shed snake skin still shows enough of the animal's patterns for a careful observer to identify the species that left it.

BEHAVIOR AND REPRODUCTION

Because they are ectothermic (ek-toe-THERM-ik), which means that their body temperature changes based on the outside temperature, many squamates sunbathe, or bask, to warm up. Others, however, stay out of sight during the day. Some of the fossorial species rarely come out of the ground at all. These species will sometimes increase their body temperatures by moving to a warmer underground spot. For hunting, many of the squamates actively walk or slither about looking for prey. Others, however, hunt by ambush, which means that they sit still,



SHOWING OFF OR BLENDING IN?

The beautiful stripes, bands, and blotches on many snakes and lizards may be helping the animal to blend into the background or to show off to predators or to mates. Most of the time, the patterns camouflage the snake or lizard by breaking up its outline and making it difficult for predators to see where the animal's body begins and ends. A striped snake, for example, may look quite noticeable on the pavement but almost disappear when placed on the many-colored forest floor where it lives. Some species, however, benefit from advertising themselves. The bright colors of numerous snakes warn potential predators to stay away, and the brilliant hues in some male lizards attract females during the mating season.



THE SHELL GAME

When it comes to living on dry land, the snakes, lizards, and worm lizards, known as squamates, have a big advantage over the frogs and salamanders. Most squamates lay eggs, just like the frogs and salamanders do, but the squamate eggs have shells. Even though the shells may be quite thin and often even flimsy, they help protect the eggs from drying out before they hatch. Without the shell, squamates would have to follow the pattern of the frogs and salamanders and lay their eggs in the water or some other wet spot. With the shell, however, the snakes, lizards, and worm lizards can make their homes well away from the water. This has allowed squamates to exist in nearly every habitat around the world.

wait for a prey animal to come along, then spring out to grab and eat it. Some snakes, including the pit vipers and the boas, have a special method of hunting. They can sense heat through small holes, called pit organs, on the face. Using these pit organs, they are able actually to see the heat given off by an animal in 3-D. These pit organs come in especially handy when hunting for food at night or in places where the snake has a limited view.

Compared to mammals and birds, squamates must have meals much less frequently. Because they are ectothermic and do not have to use their energy to keep up a constant body temperature, as the mammals and birds do, they can get by on much less food. Some of the large snakes can survive many months—even a full year—on one big meal.

Depending on the species, a squamate female may lay eggs or give birth to live young. Many species lay their eggs in nests, which are little more than holes dug in moist ground. A few, like the wormlizards, lay their eggs inside ant or termite nests. Most squamate mothers provide no care for their young and leave almost immediately after they lay

their eggs or give birth. Some lizards and snakes are exceptions. Many female skinks, for example, stay with the eggs until they hatch.

While most species reproduce only after the male and female mate, some species are parthenogenic (parth-enn-oh-GEN-ik), which means that a female can produce young by herself. In many of these species, such as the lizard known as the desert grassland whiptail, only females exist. The female's young are all identical copies of herself. Besides this species in the whiptail family of lizards, seven other families of lizards and snakes have some all-female species.

SQUAMATES AND PEOPLE

For the most part, squamates either freeze or flee when humans approach. If a person comes too close, however, many

will bite. Fortunately, most species are not venomous, and the bite only serves to surprise the person rather than hurt him or her. Some snakes, and two species of lizards, are venomous. The lizards are the Gila monster and the Mexican beaded lizard. Usually, quick medical attention can treat squamate bites.

CONSERVATION STATUS

The World Conservation Union (IUCN) lists 265 species as being at risk or as already extinct, which means they are no longer in existence. Of these, 14 are Extinct, 36 are Critically Endangered, and 31 are Endangered. Critically Endangered means the species faces an extremely high risk of extinction in the wild. Endangered means the species faces a very high risk of extinction in the wild. Many of these species have been hurt by habitat loss or by the introduction of new species, especially predators, to their habitat.

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family CHAPTER

ANGLEHEADS, CALOTES, DRAGON LIZARDS, AND RELATIVES

Agamidae

Class: Reptilia

Order: Squamata

Family: Agamidae

Number of species: About 420
species

PHYSICAL DESCRIPTION

Agamids can be rather plain, or they can look quite strange and unusual. Their bodies may have crests, or ridges of large spines, on the back and tail. They may have neck frills and folds and body decorations, such as lumps and spines on the head. Some agamids have dewlaps, or throat fans.

Agamids come in many colors. Some are gray, brown, or black, but they may also have more showy colors. The Thai water dragon is bright green with golden eyes. The rainbow lizard is yellow or orange on top and blue on the bottom. Some species, or types, can change color rapidly, depending on their mood. Their lengths range from 10 inches (25.4 centimeters) to 36 inches (91.4 centimeters). In many species, males look different from females. They often have brighter colors, especially during the mating season, and bigger body parts, such as heads. All agamids have four well-developed limbs, or legs. There are usually five toes on each foot.

The head of an agamid is large and triangular, with a visible neck area. They all have movable eyelids and a circular pupil. In most agamids the ear opening is on the side of the head. Body scales are rough or spiny in most species. Some agamids have a small or large crest, like a fin of scales, along their backs. Unlike some other lizards, agamids never lose their long tails when chased by a predator (PREH-duh-ter), or an animal that hunts the agamid for food.

phylum

class

subclass

order

monotypic order

suborder

▲ **family**



THE WEIRDEST LIZARD?

The thorny devil lizard of the Australian desert certainly looks strange. It has horns, knobs, warts, and pointed armored scales all over its 8-inch-long (20.3-centimeter-long) body. But it is a gentle creature that feeds only on ants. This lizard can eat up to five thousand black ants at a single meal! It laps the ants up with its sticky tongue. This lizard changes its color to match its surroundings, and it also can change its color pattern and body size. When bothered, the thorny devil can take in air so that it puffs up to a larger size. Thorny devils drink by collecting dew on their skin. Dew is made up of little drops of water that gather on cool surfaces. The lizard's assorted skin bumps are arranged so that dew flows through them toward the corners of the mouth.

GEOGRAPHIC RANGE

Agamids are found in Europe and Africa and throughout Southeast Asia, including Indonesia and the Philippines. They also inhabit New Guinea, the Solomon Islands, and Australia.

HABITAT

Agamids prefer to live in sandy and rocky deserts. They also may be found in dry forest habitats and dry scrub areas, which are flat areas with small bushes. Flying lizards are found in rainforests, areas with a great deal of rain and warm temperatures throughout the year. The Asian water dragon lives part of the time in trees near streams.

DIET

An agamid does not chase insects for food. Instead, it sits and waits in hiding until an insect comes by. Then out darts its sticky tongue to capture the insect and eat it. A few agamids, such as the Dabb spiny-tailed lizard, prefer plants for food.

BEHAVIOR AND REPRODUCTION

Agamids are diurnal (die-UR-nuhl), or active during the day. They spend a lot of time basking, or resting, in the sun. Some species prefer to sun themselves on flat rocky areas, while others like to climb onto tree trunks or shrubs to sunbathe. If the desert species get too hot, they go into cooler underground burrows, or holes, to rest.

Agamids have different ways of protecting themselves against predators. The bearded dragon lizard, for example, has spiny body scales. Some agamids run underground or into a rock crevice (KREH-vuhs), or crack. The Dabb spiny-tailed lizard runs into its burrow and lets the spiny part of its long, thick tail hang out. If the predator keeps pestering it, the lizard swishes its tail from side to side, which discourages most predators.

Agamid males typically are very territorial, meaning that they are protective of their living areas. A male agamid mates with females inside his territory, where several females may live.

When challenging other males for a mate, an agamid may bob its head, push up on rocks to make it look bigger, open and close its mouth, and enlarge its dewlap, the expandable flap under the chin. Some males become brightly colored during courtship. The Indian bloodsucker agamid expands the dewlap during courtship, and its head and throat turn bright red. That color gives the “bloodsucker” its name.

Most agamid females lay soft-shelled eggs after mating. The smaller agamid species lay a small number of eggs. The larger species may lay up to two dozen eggs. There may be one egg clutch, or group, per season or several throughout the year. Eggs are usually buried in damp soil or in leaf litter. There are some agamid species, such as the toad-headed lizards, that give birth to live young.

AGAMIDS AND PEOPLE

Agamids do not normally interact with people. They eat many insects, and so they are considered useful animals. A few species are captured for the legal and illegal pet trade, and some larger species are exhibited in zoos. A few larger species are caught for food.

CONSERVATION STATUS

Most agamids are not threatened. The World Conservation Union (IUCN) labels two species as Endangered, meaning that they face a very high risk of extinction in the wild. One species is listed as Near Threatened, meaning that it might soon face serious threats. Habitat loss, or loss of their preferred living area, is a major problem for agamids. The introduction of new predators, such as cats and rats, to their living areas has also harmed them.

SPECIES ACCOUNTS



SPINY AGAMA *Agama hispida*

Physical characteristics: Spiny agamas are medium-size lizards, about 12 inches (30.5 centimeters) long. They are usually gray-brown or bright green, but these colors can change. During the mating season, males have a blue head with a red throat and yellow shoulders. Females are plainer, with orange, brown, and cream-colored blotches. Spiny agamas have spines along their backs and two fanglike teeth in the front of their mouths. These teeth are strong enough to pierce tough insect shells and can give a painful bite.

Geographic range: The spiny agama lives in southern Africa.

Habitat: Spiny agamas live in and between sand dunes, or hills of sand piled up by the wind, in coastal areas and in dry semidesert areas, where some water is available.

Diet: Spiny agamas eat ants, beetles, and termites.

Behavior and reproduction: Spiny agamas live alone. They usually stay close to the ground, digging short tunnels at the base of bushes. They also climb small upright items, such as fence posts. Spiny agamas are sit-and-wait predators, meaning that they do not chase after their insect food. They wait until the insect wanders by and then catch and eat it.

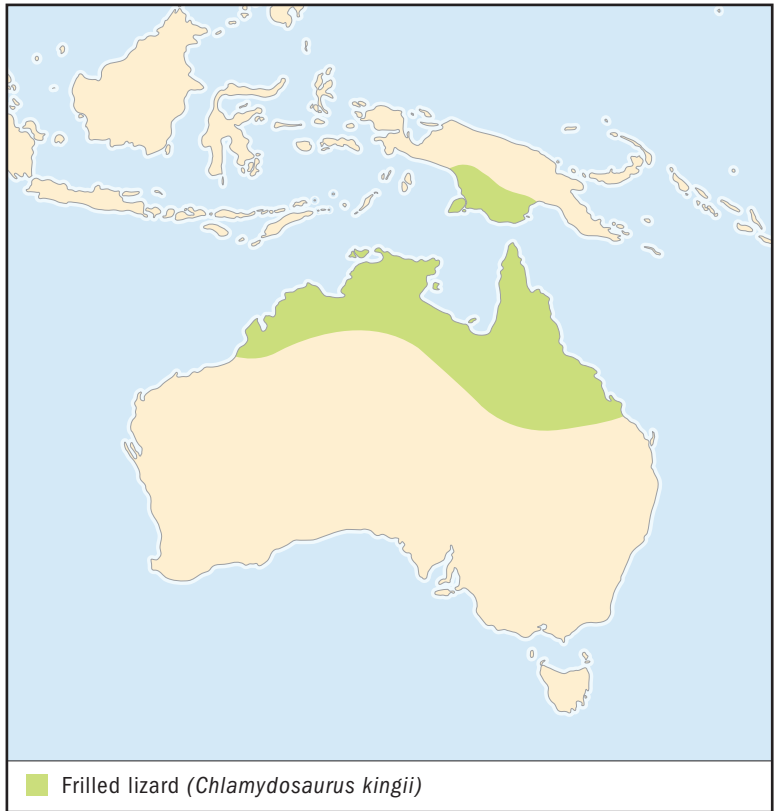
During the mating season, spiny agama males become quite colorful. Males fight to defend their living and mating territories. They will mate with several females within this area. Each female will lay about forty-five groups of eggs, each containing about thirteen eggs.

Spiny agamas and people: Spiny agamas do not interact with people. There is a popular belief that these lizards climb trees to look skyward to see if it will rain.

Conservation status: The spiny agama is not threatened. ■



Spiny agamas live in and between sand dunes. (Clem Haager/Bruce Coleman Inc. Reproduced by permission.)



FRILLED LIZARD

Chlamydosaurus kingii

Physical characteristics: The frilled lizard is large, with gray-brown coloring. Its length ranges from 2 to 3 feet (61 to 91.4 centimeters). Adult males weigh about 30 ounces (850 grams) and females about 14 ounces (397 grams). A frilled lizard has long legs and a medium-long tail. It has a large neck frill, or neck folds, made of thin skin. Most of the time, the frill is kept folded like a cape over the lizard's shoulders and back. The tongue and mouth lining are pink or yellow.

Geographic range: Frilled lizards are found in northern Australia and southern New Guinea.

Habitat: Frilled lizards inhabit grassy woodlands and dry forests. These tree-living lizards are seldom found very far away from trees.



Frilled lizards live in grassy woodlands and dry forests. They are seldom found very far away from trees. (©Steve Cooper/Photo Researchers, Inc. Reproduced by permission.)

Diet: Frilled lizards eat cicadas (suh-KAY-duhs), ants, spiders, and small lizards.

Behavior and reproduction: The frilled lizard spends most of its time on tree trunks and low branches. It is active during the day and comes down to the ground after it rains and to search for food. When it is threatened or alarmed, the frilled lizard quickly enlarges the big, red-dish-orange, fanlike frill around its neck. This frill can enlarge to a size of 8 to 12 inches across (20.3 to 30.5 centimeters). The frill has zigzag edges and red, blue, and brown spots. At rest, the folded frill helps keep the lizard cool. It also acts as camouflage (KA-mah-flahzh), a sort of disguise, allowing the lizard to look like a branch or bark.

If a predator threatens, at first the frilled lizard may hide, become absolutely still, or run to the nearest tree. If cornered, the frilled lizard faces the predator. It enlarges its frill and opens its brightly colored mouth. Sometimes it hisses, stands up on its hind legs, or leaps at the predator. If these actions do not work, frilled lizards can run on their hind legs for short distances.

Frilled lizards mate during the wet season. Males are territorial, protecting their living area. They may use their frills to attract mates. Females lay a clutch or group of eight to fourteen eggs twice a year, in spring and summer. Nests are made in flat, sandy soil, surrounded by thin grass and leaf litter. They are not covered.

Frilled lizards and people: Frilled lizards are the reptile emblem of Australia. They are shown on the Australian two-cent coin. There are

books for children about frilled lizards, and a frilled lizard was featured on one automobile commercial on television. Fire-prevention road signs in Australia say, “We like our lizards frilled, not grilled.” The frilled lizard is protected by law in Australia.

Conservation status: The frilled lizard is not threatened, but problems are expected. Toxic, or poisonous, cane toads have been introduced to the areas in which they live. Thought to be helpful, these toads instead have become pests, eating lizards and other small animals. In some areas, land clearing and the introduction of cats have caused frilled lizard numbers to decline. ■



FLYING LIZARD

Draco volans

Physical characteristics: The flying lizard is a slender, long-legged, small lizard. It measures 8 inches (20.3 centimeters) from head to tail tip. It has winglike body parts formed from thin skin stretched over extra-long ribs. When the lizard leaps from a tree, these body parts are stretched out at right angles to the body, forming a pair of gliding wings. At rest, these skin “sails” are folded along the body, keeping the lizard’s appearance slim. The lizard’s body color is gray or brown, but the wings are brightly colored. Male and female wing colors differ.

Geographic range: The flying lizard lives in Indonesia, Thailand, Malaysia, and the Philippines.



These long-tailed, lightly built lizards glide gracefully, sometimes as far as 55 yards (50.3 meters). (©Stephen Dalton/Photo Researchers, Inc. Reproduced by permission.)

Biomes: Coniferous forest, deciduous forest, rainforest

Habitat: Flying lizards live in open forests and rainforests.

Diet: Flying lizards eat ants and other insects.

Behavior and reproduction: These small lizards live in trees. On land they are clumsy and easy victims for predators. When scared, they run up a tree. When threatened, they leap off the tree. With their “wings” stretched out, these long-tailed, lightly built agamid lizards glide gracefully. The wings act

like parachutes. When gliding, these delicate, slender lizards use their tails to steer and sometimes can travel as far as 55 yards (50.3 meters). They gently land on another tree, head up. When they land, they run up the tree, getting ready for their next flight.

During mating season, male flying lizards defend their territories. They court females by displaying their bright yellow throat flap. Females lay one to four eggs.

Flying lizards and people: Flying lizards do not interact with people.

Conservation status: Flying lizards are not threatened. ■

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CHAMELEONS

Chamaeleonidae

Class: Reptilia

Order: Squamata

Family: Chamaeleonidae

Number of species: 180 species
and
subspecies

family

CHAPTER

phylum

class

subclass

order

monotypic order

suborder

▲ family

PHYSICAL CHARACTERISTICS

Chameleons (kuh-MEEL-yuns) are best known for their ability to change colors easily. Once, color change was thought to serve as camouflage (KA-mah-flahzh), or a sort of disguise, allowing the chameleon to match or blend in to its surroundings. Scientists now believe that colors change in response to differences in temperature, light, and the chameleon's mood. Colors may change in both males and females or only in males, depending on the species, or type, of chameleon. Some species can change color only into shades of brown. Others have a wider color range, turning from pink to blue or green to red. Varieties of color may be displayed on different body parts, such as the throat, head, or legs. When the chameleon is excited, stripes or patterns may appear. Sleeping or ill chameleons tend to be pale.

Chameleons range in length from 1 inch (2.5 centimeters) to 26.8 inches (68 centimeters). Males may be larger or smaller than females. A chameleon's body is flexible (FLEK-suh-buhl), meaning that it can bend easily. It can be rather flat from side to side and shaped somewhat like a leaf. This allows it to blend better with leafy surroundings. A chameleon can also make its body look longer, to seem more a part of a twig. If it is threatened by a predator (PREH-duh-ter), or an animal that hunts it for food, the chameleon can inflate, or puff up, its lungs and make its rib cage expand, to appear larger.

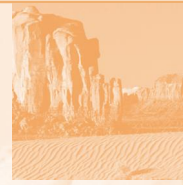
Chameleons have long, slim legs, with four feet. There are five toes on each foot. The toes are fused, or joined, in bundles

of two and three toes to form a pincer (PIN-suhr), a kind of claw for grabbing and holding. Sharp claws on each toe aid in climbing. The tail is formed in a way to help the chameleon hold on to twigs and branches.

These animals have large eyes that protrude, or stick out. Each eye can move independently of the other, so the chameleon can look in two directions at once. For this reason, chameleons can look forward, sideways, or backward without moving their heads, and they can follow moving objects without changing their body position. If they see an insect, they will focus both eyes on it to see how far away it is.

A chameleon's tongue can extend the length of its entire body, or even longer. The sticky tongue can flick out to full length within one-sixteenth of a second, fast enough to catch a fly in midair. The tongue tip is like a wet suction cup that attaches to its prey, or an animal that it hunts for food. A chameleon can capture and pull in prey weighing up to about half of its own body weight. Then the chameleon relaxes its tongue, with prey attached, and draws it slowly back into its mouth. Chameleons also use their long tongues to lap up water from leaves and other surfaces.

A chameleon's head can be covered with many bumps and bulges and other body structures that stick out. Scales on its back can resemble small or large crests, or ridges. Some crests are barely noticeable, but others are quite large. Body scales also can be found on the throat and belly. On the sides of the head there may be movable skin flaps. Bumps and growths of differing sizes may be seen on the snout, or nose area. Depending on the species, chameleons also may have one to six bony "horns," of varying sizes and shapes, on their heads. Although chameleons do not have vocal cords, or body parts used to produce sound, some species can make a hissing or squeaking noise by forcing air from their lungs. Others can vibrate (VIE-brayt), moving back and forth rapidly to create sound.



SUCCESSFUL HAWAIIAN CHAMELEONS

There are no native American chameleons, although there are many pet chameleons. Normally, the survival rate of imported chameleons is very low; they do not often live long in captivity. In 1972, however, thirty-six Jackson's chameleons were sent from Kenya, in Africa, to a pet store owner in Hawaii. Because the chameleons were so stressed from travel, the store owner released them. Some of these chameleons survived and multiplied on the island of Oahu. Jackson's chameleons are quite unusual in that they are the only chameleons in the United States that live and breed in the wild. There are now reports of wild populations in California, Texas, and parts of Florida.

GEOGRAPHIC RANGE

Chameleons are found mainly in Madagascar and Africa, and a few species live in southern Europe, Asia, the Seychelles and the Comoros. No chameleons are native to the Americas, which means that all of them were brought into the Americas. One species is now found there in the wild.

HABITAT

Chameleons live in a variety of habitats, such as dry deserts; tropical, rainy woodlands of evergreens; forests with trees that lose their leaves in winter; thorn forests; grasslands; scrublands, or land with low bushes and trees; and cloud forests, or wet, tropical, mountain forests. They can be found from sea level up to mountainous areas as high as 15,000 feet (4,572 meters).

DIET

Chameleons eat a variety of flying and crawling insects, including butterflies; insect larvae (LAR-vee), or young; and snails. The larger chameleons eat birds, smaller chameleons, lizards, and sometimes snakes. Chameleons also eat plant matter, including leaves, flowers, and fruits. Some chameleons stay within small areas for their food supply, but others travel long distances seeking food. All chameleons need drinking water, which they get from dew or rain.

BEHAVIOR AND REPRODUCTION

Chameleons are cold-blooded animals, meaning that their body temperature varies with the weather. After resting during the night, they warm up in the daytime by basking, or resting, in the sun. If they get too warm, they lower their body temperature by resting in the shade. All their activities take place during daylight hours.

Most chameleons prefer to live alone. Males are very territorial, or protective of their living areas. Males and females tolerate each other only briefly, during the mating season. When males with bony head horns fight over territory, one may lower its head and attempt to ram the other with its horns. Usually no harm is done, unless an eye or lung is damaged.

In the mating season, males try to attract females by bobbing their heads, inflating their throats, puffing up their bodies, and displaying their brightest colors. A female may accept or reject

the courting male. If she rejects him, she might run away or she might face the male and hiss at him with an open mouth. She might even attack and bite him. These bites can kill.

Most chameleon species lay eggs. Eggs are placed in tunnels or pits in the ground or under rocks or leaves. This keeps them cool and moist. After laying their eggs, females cover the area with dirt to hide it from predators. Depending on the species, young chameleons hatch one to eighteen months later. They are independent at birth and must find their own food and shelter. A few chameleon species give birth to live young, rather than lay eggs. These species often live in areas where the weather is very cold in winter and where eggs placed directly on the ground might not hatch because of the cold.

CHAMELEONS AND PEOPLE

Chameleons do not normally interact with people. Wild chameleons are sometimes caught and sold to tourists. Chameleons are also taken from their habitats in the illegal pet trade, and many die from stress or improper care. Habitat destruction, forest fires, and air and water pollution, or poison, waste, or other material that makes the environment dirty and harmful to health, are major problems.

CONSERVATION STATUS

The World Conservation Union (IUCN) lists four chameleon species as Vulnerable, meaning that they face a high risk of extinction in the wild. One is Endangered, meaning that it faces a very high risk of extinction in the near future, and one is Critically Endangered, meaning that it faces an extremely high risk of extinction.

SPECIES ACCOUNTS



JACKSON'S CHAMELEON *Chamaeleo jacksonii*

Physical characteristics: The body color of Jackson's chameleon can be shades of green or brown, with dark red, yellow, or blue on the head, sides, or tail. Males have three large, pointed, hornlike protrusions on their heads, which are used in fights with other males. Females may or may not have these "horns." Adults grow to 14 inches (35.6 centimeters) in length.

Geographic range: Jackson's chameleon is found mainly in the lower mountain ranges of eastern Africa. There is a wild population in Hawaii.



Jackson's chameleons are captured for the illegal and legal pet trade, and they typically do not survive well in captivity. (©E. R. Degginger/Photo Researchers, Inc. Reproduced by permission.)

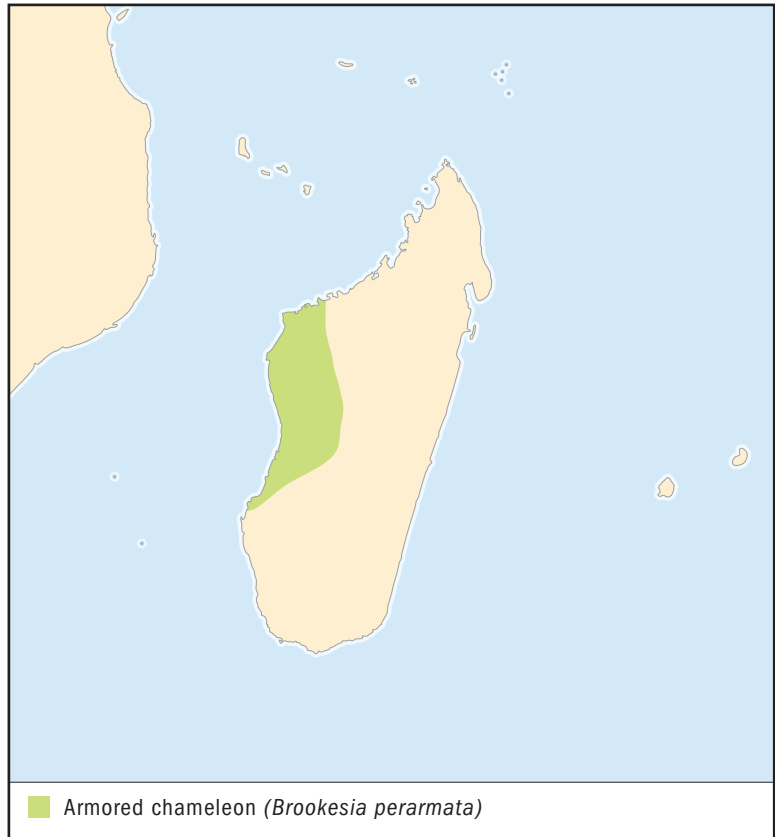
Habitat: Jackson's chameleon lives in areas with warm days and cool nights, including moist forests, crop plantations, and dense bushes.

Diet: Jackson's chameleons feed on a wide variety of insects.

Behavior and reproduction: Jackson's chameleons live in trees. They are usually calm creatures, but during courtship the male is very territorial and will fight to defend its living area or the female with whom it wants to mate. These fights are shoving contests using the horns. Males court females with their most brilliant colors and with head bobbing. Females give birth to three to fifty live young. Young are ready to reproduce at about six to ten months of age. In the wild these chameleons may live two to four years.

Jackson's chameleons and people: Jackson's chameleons do not interact with people in the wild. They are captured for the illegal and legal pet trade, and they typically do not survive well in captivity. Their living areas are suffering destruction.

Conservation status: Jackson's chameleons are not threatened, but they may become threatened unless their capture for the pet trade is closely controlled. ■



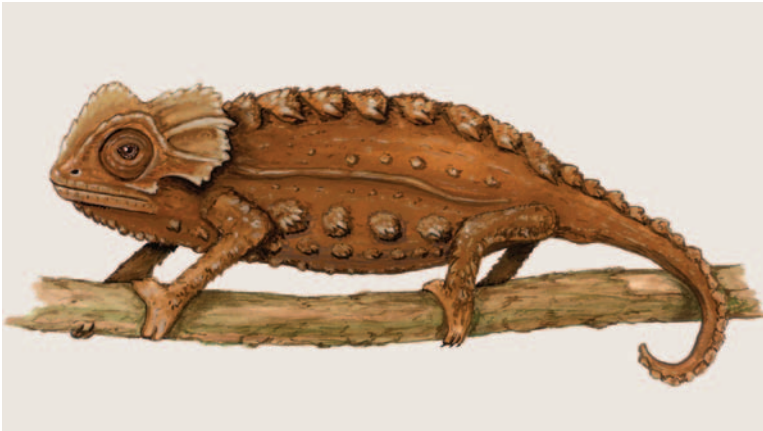
ARMORED CHAMELEON

Brookesia perarmata

Physical characteristics: The armored chameleon is reddish brown, brown, and tan. It has a row of pointed scales projecting from its spine, decreasing in size from the neck to the tail tip. The rest of the body has many thorny scales, giving it an armored appearance. Adults are 6 inches (15.2 centimeters) long.

Geographic range: Armored chameleons are found only in the Tsingy de Bemaraha Nature Reserve in Madagascar.

Habitat: Armored chameleons inhabit bushes, shrubs, and leaf litter in or near dense, dry, deciduous (di-SID-joo-wus) forest, or forests with trees that lose their leaves in cold weather.



Armored chameleons are rarely seen; they hide and do not interact with people in the wild. (Illustration by Joseph E. Trumpey. Reproduced by permission.)

Diet: The armored chameleon feeds on insects and insect larvae.

Behavior and reproduction: The armored chameleon is calm and secretive. It spends most of its life on the ground and does not move about much. Little is known about its breeding habits.

Armored chameleons and people: Armored chameleons are rarely seen; they hide and do not interact with people in the wild. They are collected for the illegal pet trade, but few survive once they are captured.

Conservation status: As a result of habitat destruction and collection for the pet trade, the IUCN has listed the armored chameleon as Vulnerable, meaning that it faces a high risk of extinction in the wild.





COMMON CHAMELEON

Chamaeleo chamaeleon

Physical characteristics: The colors of the common chameleon vary widely; they include green, yellow, gray, and brown, with many stripes and spots.

Geographic range: Common chameleons inhabit Europe, the Middle East, and northern Africa.

Habitat: Common chameleons are found in many different areas, among them, semidesert scrubland, coastal scrubland, crop plantations, and forested areas as high as 8,500 feet (2,591 meters).



The colors of the common chameleon vary widely; they include green, yellow, gray, and brown, with many stripes and spots. (J.C. Carton/Carto/Bruce Coleman, Inc. Reproduced by permission.)

Diet: Common chameleons eat insects, young birds, and small reptiles.

Behavior and reproduction: Common chameleons living in areas with very cold winters will lie dormant, slowing down or entirely stopping most of their activities until the weather warms up. At the onset of warm weather, mating begins. Females carry their young for two months and then produce about sixty eggs. The young hatch in six to eleven months.

Common chameleons and people: Common chameleons do not interact with people in the wild. They are sometimes killed crossing roadways. They are also captured for the illegal pet trade, but few survive. Habitat destruction is another threat.

Conservation status: The IUCN lists the common chameleon as Vulnerable. Only in Greece are they strictly protected. ■

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family CHAPTER

ANOLES, IGUANAS, AND RELATIVES

Iguanidae

Class: Reptilia

Order: Squamata

Family: Iguanidae

Number of species: About 900
species

PHYSICAL CHARACTERISTICS

Iguanids (ee-GWA-nids) range in size from 4 to 72 inches (10 centimeters to 2 meters). They have many different body types. There are, for example, the squat, toadlike horned lizards small enough to fit in the palm of a hand; the slim, long-tailed anoles (uh-NOH-lees); and the large marine iguanas. A typical iguanid has a long tail and four legs, with five-clawed toes on each leg. Some have body colors or body patterns that match their surroundings. They may display bright colors during the mating season. Some iguanids have scales, throat fans, crests along the back, and fringes on the toes. Certain iguanids have the ability to lose the tail or part of the tail, to distract or fool a predator (PREH-duh-ter), an animal that hunts them for food. Their teeth are placed in grooves within the jaw, rather than in sockets, or holes.

GEOGRAPHIC RANGE

Iguanid lizards are found in North America, Central America, South America, Fiji, the Galápagos Islands, Madagascar, and the West Indies.

HABITAT

Iguanids live in a variety of habitats. They usually are terrestrial, living on land. A few are arboreal, living in trees. Many prefer arid, or dry, areas. These desert dwellers often seek territories, or home areas, with at least some vegetation, rocks, or other cover to provide escape routes from predators, or animals

phylum

class

subclass

order

monotypic order

suborder

▲ **family**



THIS LIZARD WALKS ON WATER

Brown basilisk lizards are sometimes called “Jesus” lizards. When escaping a predator, they may appear to walk upright on water. These lizards have a fringe of scales on their hind toes. These fringes temporarily trap a bubble of air beneath the lizards’ feet, which keeps them from sinking if they run quickly enough across ponds or streams.

that hunt them for food. Other iguanids seek wooded areas, including rainforests. An unusual habitat is that of the marine iguana, which lives by the ocean.

DIET

Iguanids feed on insects, spiders, and smaller lizards. A few species, such as the desert iguana and the chuckwalla, eat leaves, fruits, and flowers. The marine lizard eats (AL-jee), plantlike organisms that live mainly in water.

BEHAVIOR AND REPRODUCTION

Iguanids are cold-blooded, which means that their body temperature varies with the outside weather. At night, when it is cool, many species sleep in burrows. In the morn-

ing, iguanids emerge from their burrows and rest in the sun to warm up. They are often seen stretched out on a rock. It is necessary for them to raise their body temperature to prepare for the day’s activities of feeding, perhaps breeding, and escaping ever-present predators. All iguanids are diurnal (die-UR-nuhl), meaning that they are active during the daytime. If the temperature grows too warm, these lizards find a shady spot so that they do not become overheated.

Iguanids have many predators, among them, snakes, birds, cats, rats, and wild dogs. When a predator approaches, some species remain still and blend into the surroundings. Others are quick runners and dash off almost immediately. They hide under rocks or between thick leaves and bury themselves in sand. A few species use special tactics to avoid their predators. The common chuckwalla fixes itself into a crack between rocks and then puffs up, making itself nearly impossible to remove. Horned lizards puff up too, which makes their spines stand up even higher. Biting predators will avoid the sharp spines. The zebra-tailed lizard keeps changing direction when it runs, as a way to confuse its pursuer. Other lizards squirm under the sand, so they cannot be seen.

Iguanids have lively mating behavior. Body movements include head bobbing, pushups, and open-mouth displays. Some species inflate their chests and throats and extend their dewlaps,

or throat flaps, showing bright colors. They might also curl their tails or even show bright body colors.

After courtship, mating takes place. Most iguanids are oviparous (oh-VIH-puh-rus), meaning that they lay eggs. From one to sixty eggs may be laid at one time, and egg laying may take place once or as many as four times a year. The young hatch from the eggs in one to two months. A few iguanids, such as the blue spiny lizard and the short-horned lizard, give birth to live young. Usually, the parents do not care for them. The young must find their own shelter and food immediately after birth. A few species, such as the rhinoceros iguana, will protect their egg groups for a short while. They may guard the nests with threatening body displays or even physical attacks.

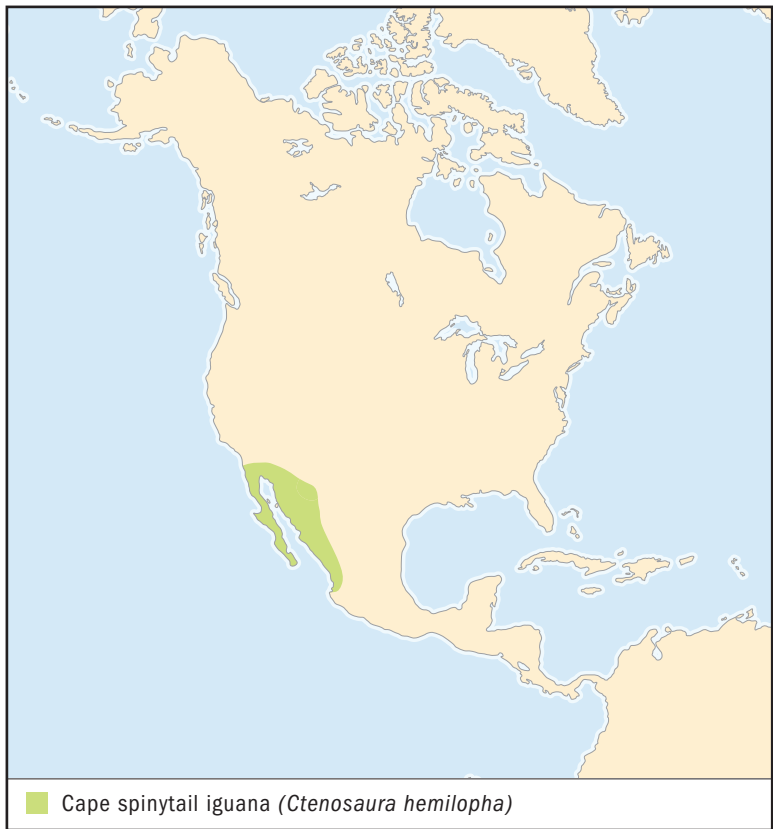
IGUANIDS AND PEOPLE

Iguanids do not interact with people in the wild. Habitat destruction from the clearing of forests and commercial land development can wipe out the places where the lizards hide and breed. Too much collecting for the legal and illegal pet trade causes problems for some species. Certain mammals (such as dogs and cats) that enter their territory along with humans can kill the lizards. In some areas people use larger lizards as food.

CONSERVATION STATUS

The World Conservation Union (IUCN) lists two types of iguanids as Extinct, meaning that none remains alive. Six species are Critically Endangered, which means that they face an extremely high risk of extinction in the wild. Four species are Endangered, which means that they are less endangered but still face a very high risk of extinction. These ten species might soon disappear from Earth. Twelve iguanids are Vulnerable, that is, they face threats that put them at high risk of extinction and they could vanish unless they are protected. One iguanid is Near Threatened, meaning that there is a risk that they will be threatened with extinction. There is not enough information to judge the status of seventeen other species. Attempts are being made to gather the eggs of endangered and threatened iguanids from the wild and raise the young in protected sites, such as zoos.

SPECIES ACCOUNTS



CAPE SPINYTAIL IGUANA *Ctenosaura hemilopha*

Physical characteristics: Cape spinytail iguanas are gray-brown, large, stocky, wrinkled lizards. They have a ridged, long tail and a crest of scales along the top of the back. Males have a larger crest than do females. An adult can reach 3 feet (1 meters) in length from the head to the tip of the tail.

Geographic range: Cape spinytail iguanas are found in northwestern Mexico, including the state of Sonora, and the islands of the Gulf of California.

Habitat: Cape spinytail iguanas live in areas with many rocky crevices, or cracks; these areas often also have trees.



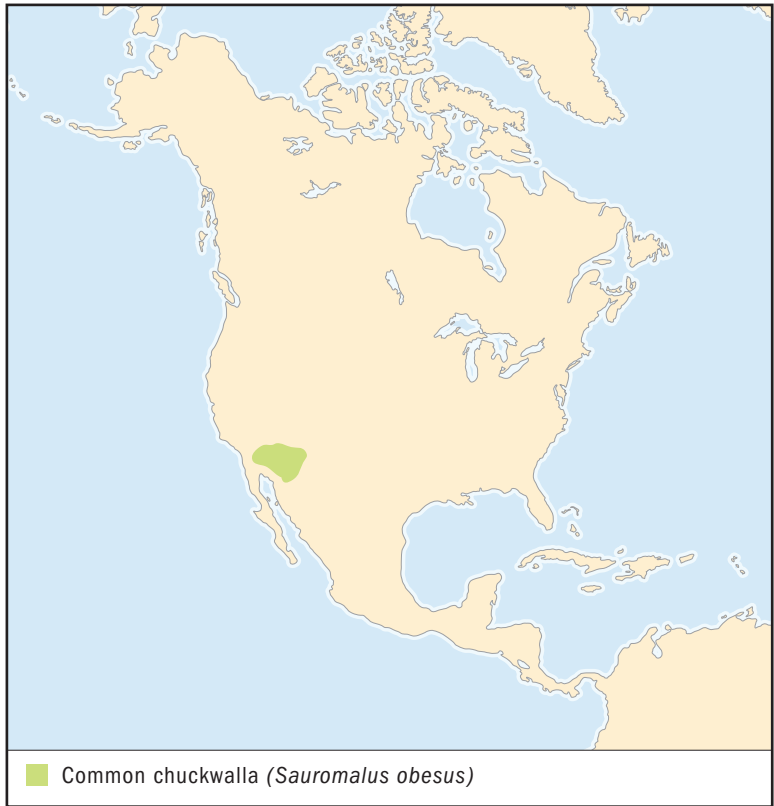
Cape spinytail iguanas live in areas with many rocky crevices, often also with trees. (©Bud Lehnhausen/Photo Researchers, Inc. Reproduced by permission.)

Diet: Cape spinytail iguanas eat flowers, fruits, and leaves. They feed only during the day.

Behavior and reproduction: Cape spinytail iguanas are territorial, protecting their dwelling areas. If threatened, they usually run into rocky crevices. If such a hiding place is not available, they can fight with their jaws and legs. These lizards usually live in groups. Each group has a dominant male, one who acts as leader. There are also less-strong males and several females. After mating, females lay twenty-four or more eggs in a group. The eggs hatch in about three months.

Cape spinytail iguanas and people: These iguanas are sold in the pet trade.

Conservation status: Cape spinytail iguanas are not threatened. ■



COMMON CHUCKWALLA

Sauromalus obesus

Physical characteristics: Chuckwallas are large, big-bellied lizards that can weigh up to 2 pounds (1 kilograms) and can reach a length of 16 inches (40.6 centimeters). They have a thick tail that is as long as the head and body together. The tail narrows to a blunt point at the end. Chuckwalla skin feels like sandpaper. There are folds of loose skin on the sides of the neck and body. Adult males have a black head, shoulders, and legs. The body color is red or gray, with yellow toward tail. Females and young have gray and yellow bands.

Geographic range: Chuckwallas are found in the United States.

Habitat: Chuckwallas live in rocky deserts with plenty of hiding places.

Diet: Chuckwallas feed on leaves, flowers, and fruits.

Behavior and reproduction: The chuckwalla is cold-blooded; their body temperature changes with the environment. Chuckwallas spend cool desert nights in burrows, which tend to remain warm. In the morning, when the sun comes up, they come out of their burrows. To warm up, chuckwallas bask, or stretch out, in the sun. They place their bodies sidewise to the sun, to warm them up more quickly. They bask until they reach a temperature of 100°F (38°C). Then they begin searching for food. If the surrounding temperature becomes too hot, chuckwallas hide under rocks or bushes until the weather cools down.

When disturbed, the chuckwalla hides in a rock crevice. It begins gulping air. The loose skin folds around its neck and the sides of its body puff up, until the chuckwalla becomes larger. For the moment, it is jammed in the rock crevice, and this makes it almost impossible for a predator to pull it out. If, however, a predator does manage to grab a chuckwalla by the tail, the tail separates from the body and wriggles. This distracts the predator, letting the chuckwalla escape. A new tail grows back.

Chuckwallas make a combination of movements to defend a territory or attract a mate: head bobbing, open-mouth displays, and body pushups. In the summer, females place five to ten eggs in rock crevices. The eggs hatch two months later, in early fall.

Chuckwallas and people: Chuckwallas are sold in the pet trade and sometimes are eaten as food.

Conservation status: Chuckwallas are not threatened with extinction. ■



Chuckwallas are large, big-bellied lizards that can weigh up to 2 pounds (1 kilograms). (Wai Ping Wu/Bruce Coleman Inc. Reproduced by permission.)



GREEN ANOLE

Anolis carolinensis

Physical characteristics: Green anoles are slim lizards with narrow, pointed heads and long, thin tails that can be twice as long as the rest of the animal. Body sizes range in length from 5 to 8 inches (12.7–20.3 centimeters). The body color can vary from shades of brown to shades of green. Males are larger than females. Both males and females have dewlaps, or throat fans, but the male dewlap is much larger. Dewlaps can inflate, or enlarge. An inflated dewlap is reddish-pink. Green anoles are sometimes called “chameleons” (kuh-MEEL-yuns), owing to their ability to change color, but they are not true chameleons.

Geographic range: The green anole is the only anole that inhabits the United States. These anoles are also found in Cuba and on Caribbean islands.

Habitat: The green anole lives on the ground but suns itself in small trees and shrubs, on vines and tall grasses, and within palm fronds. It likes vertical surfaces, or ones that stand upright, such as fence posts and walls.

Diet: The green anole hunts and eats small insects and spiders and laps water from leaves.

Behavior and reproduction: Green anoles are active in the daytime. If they are grabbed or threatened, their tails can fall off. A new tail will grow, but the new tail usually does not match the previous one in color or size.

During the breeding, or mating, season, males court females by facing them. They bob their heads up and down, and expand, or make larger, the bright pink dewlap under the throat. Next, the male may approach the female with a stiff-legged walk. If the female accepts the male, she stays still and arches her neck. If she does not accept him, she runs away. After mating, female lays single eggs every two weeks, for a total of about ten eggs per breeding season. She places the eggs in warm, moist spots, such as leaf litter. Young appear in five to seven weeks.

Green anoles and people: Green anoles are popular pets.

Conservation status: Green anoles are common in the southeastern United States. ■

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Green anoles are sometimes called "chameleons" owing to their ability to change color, but they are not true chameleons. (©David M. Schleser/Nature's Images/Photo Researchers, Inc.)

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family CHAPTER

GECKOS AND PYGOPODS

Gekkonidae

Class: Reptilia

Order: Squamata

Family: Gekkonidae

Number of species: 1,109 species

PHYSICAL CHARACTERISTICS

Geckos range in size from 0.67 inch (17 millimeters) to 14 inches (35.6 centimeters) in length. The smallest gecko weighs about 0.07 ounce (1.98 grams). The largest gecko, which lives in rainforests, can weigh up to 1.5 pounds (680 grams). While most geckos are brown, gray, or black, a few are yellow, red, blue, orange, or green. They may be plain, or they may have stripes or spots. Colors on the head and neck may be different from the colors on the back. The nocturnal geckos, or those that are active at night, are plainer than the diurnal (die-UR-nuhl) geckos, or those active in the daytime, which tend to have brighter colors.

Geckos usually have flattened bodies and four short limbs, or legs. Each limb has five toes. Some species have claws on each foot. Other types of geckoes have widened toe pads. These toe pads are made to allow the gecko to stick to smooth surfaces. Geckos have large eyes that are open all the time. Except for a few species, the eyes do not have movable eyelids. Instead, the eyes are protected by clear, see-through scales, or thin coatings. Geckos clean these scales regularly with their long tongues. Most geckos are nocturnal. These geckos have vertical pupils (PYU-puhls), meaning that they are positioned straight up and down, in the center of their eyes. Diurnal geckos have round pupils in the center of their eyes. Pupils are parts of the eye that allow light to enter.

Gecko skin is soft and loose and typically covered with granular, or grainy, scales that do not overlap. A few species have

phylum

class

subclass

order

monotypic order

suborder

▲ **family**

smooth skin. Gecko tails come in varied shapes. Many geckos have tails shaped like carrots or turnips. Some have rounder tails that are used to store food.

Pygopods (PIE-go-pods) are also called “snake lizards,” limbless lizards,” and “flap-footed lizards.” They range in length from less than 8 inches (20.3 centimeters) to 2 feet (61 centimeters). Their colors range from pale yellow to dark brown, with or without a pattern of spots or stripes.

Pygopods have a narrow face and an almost snakelike appearance. The snout, or nose area, is pointed. The eyes are always open, protected by transparent, or clear, scales. Most pygopods do not have an outside ear opening. They have no front limbs and only flaplike hind limbs. Their long tails break off easily.

GEOGRAPHIC RANGE

Pygopods are found in Australia and New Guinea. Geckos are found in the tropics and subtropics, the warmer areas of the world. These areas include India, Nepal, Burma, the Malaysian peninsula, China, the Philippines, Indonesia, New Zealand, Saudi Arabia, Central America, and South America. Geckos and skinks are often the only land reptiles on remote islands in the ocean. A few gecko species have been found in southern Europe, southern Siberia, and the southwestern United States.

HABITAT

Geckos live in a variety of habitats. Their preferred living areas include coniferous forests, with pine and other evergreen trees, and deciduous forests, where trees, such as maples, lose their leaves each year. They also live in rainforests, tropical forests that get at least 100 inches of rain per year; this type of forest has many very tall evergreen trees that form a thick umbrella of leaves and branches overhead. Geckos also live in deserts and in grassland, or meadows. Pygopods live in desert and in grassland.

DIET

Nearly all geckos eat insects and spiders. A few larger species eat small snakes, small lizards, and baby birds. In some habitats, geckos also eat plant pollen and ripe fruit. Smaller pygopods are insect eaters, and larger ones eat snakes and lizards.

BEHAVIOR AND REPRODUCTION

Most geckos are nocturnal. During the day they typically hide under tree bark or in tree hollows. In the early evening they come out to feed and to look for mates. The diurnal species are most active in the late morning and middle of the afternoon. In tropical areas, which are warm throughout the year, geckos stay active all the time. In other areas, geckos enter burrows or rock cracks and remain there most of the time during the cool season.

Geckos typically live by themselves; only a few types live in groups. Some species are seen around peoples' homes. Males defend their feeding and resting places by using warning sounds, usually many clicks and chirps. Defense methods include running away; squirting a sticky fluid at predators, or animals that hunt them to eat them; biting; and shedding their tails. A gecko's tail will continue to wriggle after it is shed, fooling the predator and allowing the gecko to escape. Some gecko species also can shed body skin if they are grabbed by other animals. This skin regrows, as do the tails.

Geckos are the most vocal lizards, meaning that they make the most sounds. Most geckos make several different sounds, including barking, croaking, squeaking, and chirping. The giant Asian Tokay gecko makes a loud noise that sounds to some people like "geh-oh." It is possibly from this sound that the gecko gets its name.

During mating season, the males of some species have violent fights over females.

After mating, most gecko females lay a nest of two hard-shelled or leathery eggs. Some tropical species lay eggs throughout the year, and others have just one clutch, or nest of eggs. Some lay several egg groups within a mating season. Eggs are placed under loose bark or under a rock, where it is slightly damper than it is in the open air. Hatching occurs in six to ten weeks. A few species give birth to living young instead of laying eggs.

Because pygopods are secretive, not much is known about them. They hide in rocky areas, in tall grass, and in burrows.



WALKING UP WALLS

Scientists have investigated how geckos can walk up shiny walls and across ceilings. They found that geckos have millions of tiny foot hairs, called "setae" (SEE-tee), on each toe pad. The tips of these setae are very sticky. Geckos can hang from a wet or dry ceiling attached by just one toe. How do they get their feet off the ceiling and move? Scientists think that they peel foot hairs off like tape.

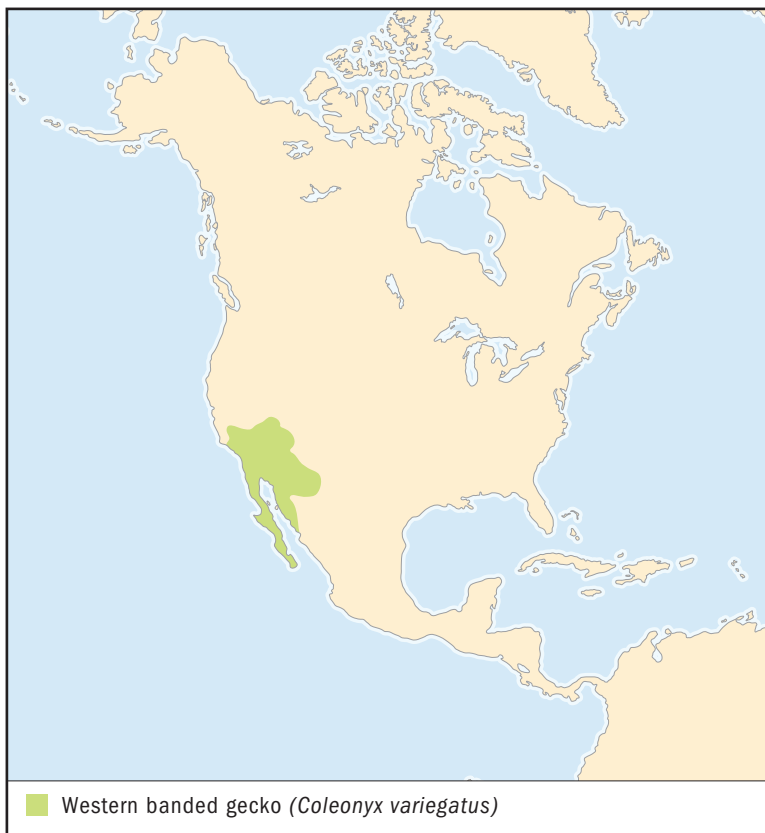
Some are active during the day. The desert species move about at night. After mating, females lay two eggs per clutch.

GECKOS, PYGPODS, AND PEOPLE

Pygopods seldom have anything to do with people. Some gecko species live near human homes. They are valuable in insect control, eating mosquitoes, flies, and cockroaches. In some areas of the world, deforestation, or the cutting down of trees, destroys their habitat. The killing of geckos by rats, cats, and other predators has led to declines in the numbers of geckos in some areas. In parts of Asia, geckos are used in medicines. Geckos, especially the brightly colored ones, are collected for the legal and illegal pet trade. A few species breed, or multiply, readily in captivity and do well.

CONSERVATION STATUS

The conservation status of most species is unknown. Because of illegal pet trade collection, the World Conservation Union (IUCN) lists one brightly colored group of geckos as Endangered and internationally protected.



WESTERN BANDED GECKO

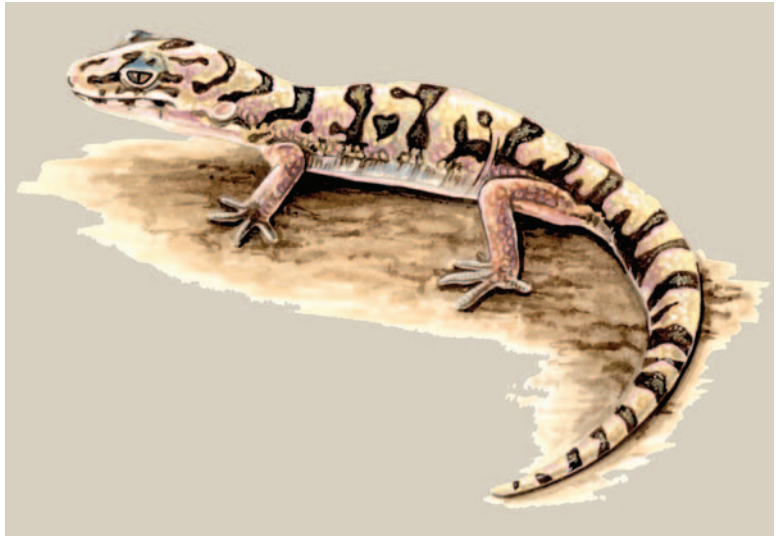
Coleonyx variegatus

SPECIES ACCOUNTS

Physical characteristics: The western banded gecko, also known as the banded gecko, is 4.5–6 inches long (11–15 centimeters) from its head to the end of its tail. The skin on its back is made up of small, grainy scales. The skin is delicate, soft, and loose. The gecko's back and tail are cream colored, with wide black or brown stripes that run from side to side. The tail is long, and the head is somewhat large. The eyes have eyelids that move, with pupils that are vertical.

Geographic range: Western banded geckos are found in the southwestern United States and northern Mexico.

Western banded geckos eat insects and spiders. Surplus food may be stored as fat in the tail. (Illustration by Patricia Ferrer. Reproduced by permission.)



Habitat: Western banded geckos are found in dry desert dune, or hill, areas; dry juniper-oak woodlands; desert areas with small shrubs; and rocky desert sites.

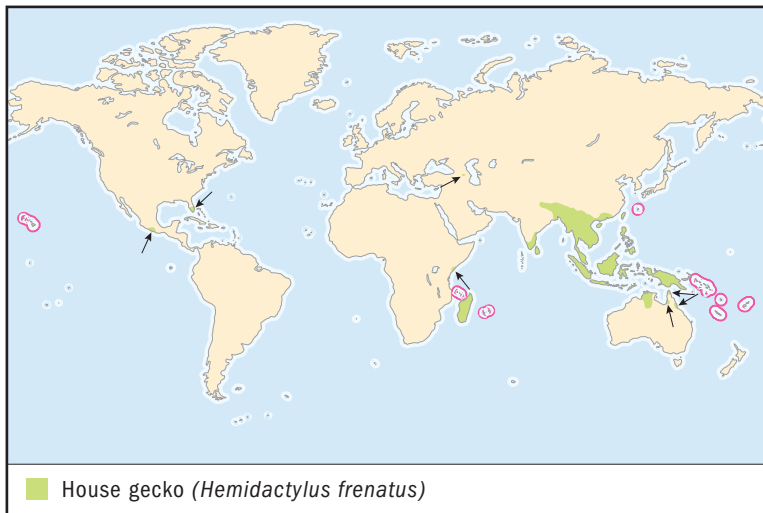
Diet: Western banded geckos eat insects and spiders. Surplus, or extra, food may be stored as fat in the tail.

Behavior and reproduction: Western banded geckos move about only at night. They rest during the day under rocks or within the burrows, or underground homes, of small animals. During the day these areas are damper than areas above ground. Several of these geckos may rest together in the burrows. If the burrow is disturbed, the western banded gecko may twitch its tail like a cat. If it is attacked, it runs away quickly. It may leave its tail behind to distract the attacker.

During the mating season, western banded gecko males face each other and make threatening movements. After mating, females lay two or more egg groups, with two eggs in each group. Hatching takes place in thirty to forty-five days.

Western banded geckos and people: Western banded geckos are kept as pets, and they have been successfully bred in captivity. They have no other human interaction.

Conservation status: The western banded gecko is not threatened. ■



HOUSE GECKO

Hemidactylus frenatus

Physical characteristics: The house gecko is grayish, pinkish, or pale brown with darker flecks. The color may vary, depending on the surrounding temperature. It also may vary depending on the surface on which the gecko is resting; this gecko can blend with its background, such as a tree branch or a leafy area. The body is flattened. This gecko grows to 2.6 inches (66 millimeters) in length, from the head to the base of the tail. It has toe pads on each of its toes, and the first toe is smaller than the rest.

Geographic range: House geckos exist in Southeast Asia, the Philippines, Taiwan, and much of Micronesia, Melanesia, and Polynesia. It was introduced, or brought by people, into tropical Australia, eastern Africa, Mexico, and the United States.

Habitat: These geckos live among many types of vegetation, or greenery, including tropical rainforest and dry scrubland, or land covered with low trees and bushes. They are often found around human homes and rubbish dumps.

Diet: House geckos eat insects.

A house gecko can blend with its background, such as a tree branch or a leafy area.
(Illustration by Patricia Ferrer.
Reproduced by permission.)



Behavior and reproduction: This gecko is active at night, although it may be seen outside on cloudy days. Male house geckos can be unfriendly and mean. This is especially true when there are many of them in one area and plenty of food. They can produce several types of clicking sounds, including “chi-chak.”

After mating, females can store sperm (SPUHRM), the male reproductive cells that fertilize the female’s eggs. The females lay groups of hard-shelled eggs throughout the year, and the eggs hatch in forty-five to seventy days.

House geckos and people: This species is often found in and around people’s homes.

Conservation status: The species itself is not threatened, but it may cause a decrease in native geckos in the areas where it is introduced. House geckos are unfriendly and compete for the food supply of other gecko species. ■

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BLINDSKINKS

Dibamidae

Class: Reptilia

Order: Squamata

Family: Dibamidae

Number of species: 15 species

family

CHAPTER

phylum

class

subclass

order

monotypic order

suborder

▲ family

PHYSICAL CHARACTERISTICS

Blindsinks (also called “blind lizards,” “blind skinks,” “leg-less lizards,” and “wormlizards”) are small to medium-sized lizards with a slim, snakelike form. They are fewer than 10 inches (25.4 centimeters) long. Their body colors range from pale pink to light brown, with the under area, or belly, sometimes a bit paler. Their bodies are covered with shiny, smooth, and squarish overlapping scales. The scales on the head are large and platelike, especially on the snout, or nose area, and lower jaws.

The heads of these reptiles are blunt, not pointed. The bones of the skull are fused, or firmly joined together. This makes the head area very solid, which helps in burrowing, or digging holes. Their tiny eyes look like dark specks and have no lids. The eyes are hidden under a head scale that does not move. The nostrils, or nose openings, are small and placed at the tip of the snout. These lizards have no ear openings that can be seen. Their ears are covered with scales. There are only a few lower teeth, set in sockets, or hollow openings. The teeth are small and pointed, curving backward. The tongue is short and wide and is not divided at the tip. The tip of the tongue does not retract, or pull back, completely.

The tails of blindsinks are very short and blunt. They are able to break off at various places to deter predators (PREH-duh-ters), or animals that hunt the blindsink for food. Blindsinks do not have any working limbs, or legs. Males have

small, flaplike hind limbs, or back legs. These limbs may be used in mating. Females have no limbs or flaps. Pectoral (PECK-ter-uhl), or chest, bones are absent. The hip-bone area is very small. These features give the blindskink its slim shape.

GEOGRAPHIC RANGE

The majority of blindskink species are found in eastern India; southern Thailand; Borneo; Vietnam; Laos; Kampuchea; the Nicobar, Sunda, and Andaman Islands; southern China; Sumatra; Malaysia; most of Indonesia; the Philippines; and westernmost New Guinea. A single species is found in a very small area of northeastern Mexico.

HABITAT

Almost all blindskinks live in rainforests. Most species require damp humus (HYU-mus) or broken up, loose, rotting plant material. During the dry season these species of blindskink burrow beneath rocks or logs. The blindskink of northeastern Mexico has adapted to a wider type of living area. It is found in semiarid deciduous (di-SID-joo-wus) brushland and open scrubland, or areas with bushes and small trees that lose their leaves in dry or cold weather. This lizard also lives in desert areas, often near ant and termite nests. It also inhabits pine-oak forests. It has been found beneath rocks, in or under rotting logs, in loose litter, and in the decayed, or rotting, bases of yuccas, a treelike plant that grows in dry areas.

DIET

Blindskinks feed on tiny insects, such as ants and termites and possibly spiders.

BEHAVIOR AND REPRODUCTION

Very little is known about the living habits of blindskinks. They are secretive lizards, preferring to hide. Blindskinks live on the forest floor, often underneath stones, but sometimes



WHO ARE THE RELATIVES?

Scientists are still trying to find out more about the blindskinks' evolution (eh-vuh-LU-shun), or the changes they have undergone to adapt to their environment over time. These are very unusual lizards, both in appearance and in living habits. Most species are known from fewer than 20 specimens, or examples. Over the years scientists have proposed that blindskinks are related closely to snakes; geckos; skinks; carnivorous (KAR-nih-vuh-rus), or meat-eating, anguid lizards; and worm lizards, which look like earthworms. There is still no definite answer.

A blindsink on the forest floor in Vietnam. (Robert W. Murphy. Reproduced by permission.)



underneath leaf litter or moving about underground. They enter the earth through cracks in the soil or by way of tunnels made by other animals. In soft, loose soils or rotting leaf litter their slim body shape and rigid head allow them to dig their own tunnels. Blindsinks may take up residence in tunnels made by other insects or in the underground homes made by insects that live in groups, such as termites.

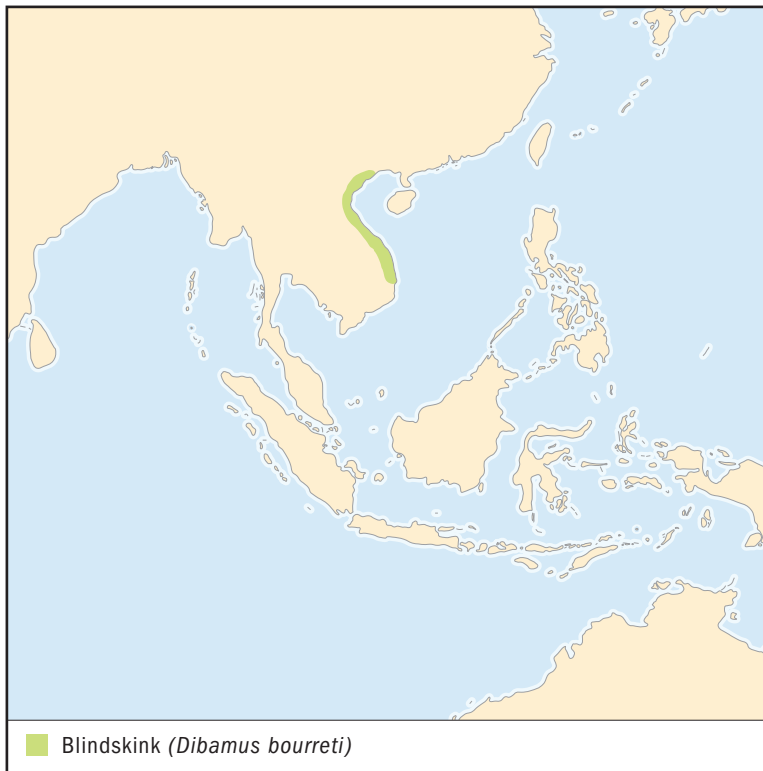
Nothing is known of the mating or egg-laying habits of the blindsinks living in Mexico. Little is known of the mating habits of the rainforest species. It is believed that after mating, the females lay just one egg. An egg may be laid more than once a year. The eggs are soft and somewhat long. Later they become harder and shaped more like eggs.

BLINDSKINKS AND PEOPLE

Blindsinks do not interact with people. Few people ever see them.

CONSERVATION STATUS

Blindsinks are not threatened. Many species suffer from loss of their habitat, or their preferred living area, as the result of movements of people, farming, tree removal, and pollution, or poison, waste, or other material that makes the environment dirty and harmful to health. There are no conservation efforts under way to protect blindsinks.



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WORMLIZARDS

Amphisbaenidae

Class: Reptilia

Order: Squamata

Suborder: Amphisbaenia

Family: Amphisbaenidae

Number of species: 160 species

family

CHAPTER

phylum

class

subclass

order

monotypic order

suborder

▲ family

PHYSICAL CHARACTERISTICS

The members of this family, known simply as wormlizards, are long, thin, legless animals. Their scales are arranged in rings around the body with each ring separated from the next by a shallow groove. This ring and groove pattern makes them look much like earthworms, even though the worms lack scales. In some species of wormlizard, the head is round. In others, it may be shaped like a shovel, or in some cases the snout may come to a point. They have no openings for their ears, as the lizards do, and they have only the smallest of eyes showing below a see-through scale, if they are visible at all. They have no legs, but all species in this family have tiny bits of hip bones inside their bodies. They do not, however, have a sternum (STER-num), which is the bone at the front of the chest that in most animal species connects to the ribs.

Most wormlizards reach about 10 to 16 inches (25 to 40 centimeters) long as adults, but some species are much smaller or much larger. The smallest species lives in Africa and only grows to 4 inches (10 centimeters) long, while the largest, known as the white-bellied wormlizard, can reach more than 32 inches (80 centimeters). A wormlizard's tail, which can look much like the rest of the body, actually starts at the vent, a slit-like opening on the underside of the animal. The tails in these animals are very short, usually less than one-tenth of the overall body length. The tails may be rounded, pointed at the end, or have a flattened shape. Many of the 160 species of wormlizards have about the same color: pale pink or pale orange-pink, sometimes

with a whitish belly. Some species, however, are colored brown, yellow, purple, or gray, and a few even have eye-catching black-and-white patterns. The males and females of each species look alike.

The wormlizards in this family have many of the same features of three other families of animals: the mole-limbed wormlizards, the Florida wormlizards, and the spade-headed wormlizards. These four families all fall under the group called amphisbaenians (am-fizz-BAY-nee-ens). Like the wormlizards in this family, many of them look much like earthworms, and all except the mole-limbed wormlizards are legless. Interestingly, all wormlizards have only one lung, or one large lung and one tiny lung, and one larger tooth in the middle of the upper jaw. In those that have eyes, they have no eyelids. They also have a forked tongue and a thick, strong skull. They have an unusual hearing system that allows them to pick up even slight vibrations underground. In this system, a little structure attaches the ear to tissue on the side of the face. When they are slithering about, they can feel vibrations through the ground with the bottom of the face. The vibration then runs up the tissue and to the ear, which hears it. This ability, which lets the wormlizards hear even small movements made by other animals, comes in particularly handy when the wormlizards are looking for ants and other insects to eat.

GEOGRAPHIC RANGE

Wormlizards live in both the western and eastern hemispheres, including South America, Central America, the West Indies, Africa, Asia, and Europe. They tend to live in tropical areas or in spots with a slightly less warm, subtropical climate.

HABITAT

Wormlizards stay out of sight most of the time, either remaining in their burrows or beneath rocks or leaf litter on the ground. Some of them make themselves at home in the nests



IS IT A WORM OR A LIZARD?

Is a wormlizard more like a worm that looks like a lizard, or a lizard that looks like a worm? Animals are split into two major groups: vertebrates, which have backbones, and invertebrates, which do not have backbones. Wormlizards and lizards have backbones, but earthworms do not, so wormlizards are more like lizards than earthworms. In fact, both wormlizards and lizards are reptiles, but wormlizards are not true lizards. Instead, wormlizards are a unique group of reptiles that mostly live underground, have rings of scales separated by shallow grooves, and have a number of other characteristics that separate them from the lizards.

of ants or termites, possibly even laying their eggs or having their young there. They will come out on the surface after particularly heavy rains that flood their underground homes.

DIET

Wild wormlizards eat mainly ants, termites, beetles, grubs (young beetles), caterpillars, and cockroaches. In one study, scientists looked inside the stomachs of wormlizards and found that some were filled with fungi. In another study, they found one wormlizard that had eaten a lizard, or at least its leg, and another that had swallowed a burrowing snake—whole. In captivity, wormlizards will eat other large vertebrates (VER-teh-brehts), which are animals with backbones, so some people believe they may do the same in the wild.

BEHAVIOR AND REPRODUCTION

Wormlizards are fossorial (foss-OR-ee-ul), which means that they stay underground most of the time. Depending on the shape of the head, they dig their tunnels in different ways. Those with a round head butt their heads straight into the dirt like a battering ram and move forward that way. Other species with heads shaped like shovels, scoop up dirt onto the top of the head and then press it into the roof of the tunnel. Those with sideways-flattened heads, on the other hand, press the head and the body side to side and force an opening through the soil. No matter how they make their tunnels, they all use them to hunt for animals to eat. They mostly hunt by using their excellent hearing and by smelling. Like other amphisbaenians, wormlizards have forked tongues that pick up chemicals left by prey animals. They then touch their tongues to a small opening on the roof of the mouth that opens to a special organ. This organ, called a Jacobson's organ, can smell the chemicals.

Although wormlizards stay underground, which protects them from most predators, they sometimes come under attack. When this happens, most species can drop the tail, which can confuse a predator (PREH-duh-ter) enough to give the wormlizard time to escape. Unlike many of the lizards that also drop their tails, wormlizards cannot regrow theirs.

Scientists know little more about their behavior, courtship, or mating. The females of most species lay eggs, but some give birth to baby wormlizards. The number of eggs in each clutch is typically between one and four, although a few species can

lay more than a dozen. Females sometimes lay their eggs inside ant or termite nests.

WORMLIZARDS AND PEOPLE

Wormlizards and people rarely run across one another.

CONSERVATION STATUS

None of these species is considered endangered or threatened.

SPECIES ACCOUNT



WHITE-BELLIED WORMLIZARD *Amphisbaena alba*

Physical characteristics: Among the largest members of the family, the white-bellied wormlizard can grow to 33.4 inches (85 centimeters) long with a body that can reach up to 2 inches (25 centimeters) wide. Adults can, however, be much smaller, growing to only half that size. Of their total length, only 6 percent is tail. Like other wormlizards, their scales form rings around the body and give the animal an earthworm-like appearance. The scales on their back are small and square. They have a rounded head with one large tooth and six smaller ones in the front of the upper jaw.



White-bellied wormlizards almost always stay in underground tunnels, buried under dead leaves, or inside the nests of leaf-cutter ants. (Illustration by John Megahan. Reproduced by permission.)

Geographic range: The white-bellied wormlizard lives in Panama, which is in far southern Central America, in the West Indies, and in South America east of the Andes Mountains.

Habitat: This burrowing animal almost always stays in its underground tunnels, buried under dead leaves, or inside the nests of leaf-cutter ants.

Diet: With its strong jaws, the white-bellied wormlizard can eat animals as large as mice and rats in a scientist's laboratory. In the wild, however, they are known only to eat smaller animals, such as ants, termites, crickets, and other insects, as well as spiders and other invertebrates (in-VER-teh-brehts), which are animals without backbones.

Behavior and reproduction: Unlike other wormlizards that drop the tail when they feel threatened, this species cannot. Instead, it curls up its body so the head and tail are next to one another, and then raises its head and opens wide its mouth while lifting up and swaying its tail. This behavior makes the wormlizard almost look as if it has two heads, and, in fact, some people call it a "two-headed snake." Females lay eight to 16 eggs at a time, probably once a year during the dry season.

White-bellied wormlizards and people: White-bellied wormlizards and people rarely run across one another.

Conservation status: This species is not considered endangered or threatened. ■

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family

CHAPTER

MOLE-LIMBED WORMLIZARDS

Bipedidae

Class: Reptilia

Order: Squamata

Suborder: Amphisbaenia

Family: Bipedidae

Number of species: 3 species

PHYSICAL CHARACTERISTICS

The three species of mole-limbed wormlizards in this family are sometimes confused with earthworms, but they have scales and front legs. They are one of four families that fall into the group known as wormlizards or amphisbaenians (am-fizz-BAY-nee-ens). In all amphisbaenians, small rectangular scales form circular rings around their long thin bodies. A worm has rings around its body, too, but it has no scales and lacks most of the other features of wormlizards. Mole-limbed wormlizards, like other amphisbaenians, have one large tooth in the middle of the upper jaw, a thick and strong skull, small and sometimes invisible eyes, and a forked tongue. They do not, however, have ear holes or eyelids, like most lizards do. The mole-limbed wormlizards are different from other wormlizards, because they have a pair of small but strong front legs right behind the short rounded head. In addition, one of their clawed fingers has an extra bony piece, compared to the fingers of other reptiles. Mole-limbed wormlizards use their strong front legs, and probably this extra finger bone, to help them dig. Some scientists believe that, because the mole-limbed wormlizards have front legs, they are probably the most primitive of all the amphisbaenians. Other scientists disagree. These questions will no doubt continue, since no one has yet found a single fossil of any member of this family. Although mole-limbed wormlizards do not have hind legs, the skeleton still has some bits of hip bone and a tiny nub of thigh bone.

Mole-limbed wormlizards grow to 4.5 to 9.4 inches (11.5 to 24 centimeters) long and at the middle of the body are about

phylum

class

subclass

order

monotypic order

suborder

▲ **family**



WHAT DO THEY EAT?

In many cases, scientists learn about the diets of animals by watching them eat. When the animal eats at night or underground, however, their food habits can remain a mystery. This is true of the mole-limbed wormlizards. Instead of trying to catch a peek of one of these hard-to-find animals dining in the wild, scientists sometimes collect their droppings. Droppings, also called feces (FEE-sees), contain clues to the animal's diet, such as bits of food that the animal could not digest. If the wormlizard ate an insect, for example, the droppings might contain a little piece of the insect's leg. In addition, scientists sometimes find a dead animal in the wild and cut open its stomach to see what is inside. Through these two methods, they can learn what even the shyest of animals eat.

0.27 to 0.39 inches (7 to 10 millimeters) across. Only one-tenth to one-fifth of the body length is tail. The body is very bland-looking with no pattern and is colored pale pink, sometimes with a slightly orange tint. Individuals occasionally have a whiter belly. This animal sheds its skin (actually just the outer layer of skin) once in a while. When it sheds, the skin layer comes off in a single piece, just like it does in most snakes.

GEOGRAPHIC RANGE

The three species of mole-limbed wormlizard, or ajolote (ah-joe-LOW-tay) as they are often called, live in western Mexico. Depending on the species, they may make their homes in Baja California, Guerro, or Michoacán.

HABITAT

Mole-limbed wormlizards are found along the coast in deserts and dry shrubby areas, in dried streambeds, or in the shoreline soils of streams and rivers. They usually remain in their underground burrows but sometimes crawl above ground, especially at night.

DIET

Mole-limbed wormlizards are like many other underground-living, or fossorial (foss-OR-ee-ul), animals in that their diet is something of a mystery. Scientists have not watched them feed but have occasionally caught them and looked at what was in their stomachs. From these scraps of partially digested food, they have learned that the mole-limbed wormlizards will eat ants, termites, grubs, and other invertebrates (in-VER-teh-brehts), which are animals without backbones. These species find their food underground or beneath logs, rotting leaves, and other things that cover the ground by following chemicals trails that the invertebrates leave behind. Mole-limbed wormlizards pick up these chemicals with the tongue. The tongue then places the chemical odors on a little opening, or duct, on the roof of the mouth that connects to a special organ. This organ, called a Jacobson's organ, helps them smell the chemicals.

BEHAVIOR AND REPRODUCTION

These three species spend most of their time in the underground tunnels that they dig. They dig their tunnels with their front legs and with their heads, typically starting new tunnels with their legs and then switching to their heads to make them longer and deeper. When they are digging with their heads, they lay the front legs along the sides of the body. Their tunnels can wander through the soil, sometimes opening underneath rocks or logs at the surface, scooting along less than an inch (2.5 centimeters) underground, or dropping down to almost 8 inches (20 centimeters) deep. At night, they may leave their tunnels and crawl about above ground, but they rarely venture out during the daytime. By living underground, they avoid most predators. If a predator (PREH-duh-ter) does manage to capture one, the mole-limbed wormlizard is able to drop its tail. Unlike many other lizards, however, it does not regrow its tail.

Females of all three species lay eggs, usually one to four at a time. Some may only have young every other year. Females in two of the three species lay their eggs in January, and the eggs hatch three months later. Females of the third species lay their eggs in July, and the eggs hatch two months later.

MOLE-LIMBED WORMLIZARDS AND PEOPLE

People rarely see these animals. Occasionally, a person may turn over a rock or log and see a mole-limbed wormlizard for a few seconds until it quickly slinks back into its tunnel and disappears. Although people rarely think about them, the wormlizards may be helpful to humans because they eat termites and other so-called pest animals.

CONSERVATION STATUS

Scientists still have much to learn about these animals; however, they are not now considered endangered or threatened.

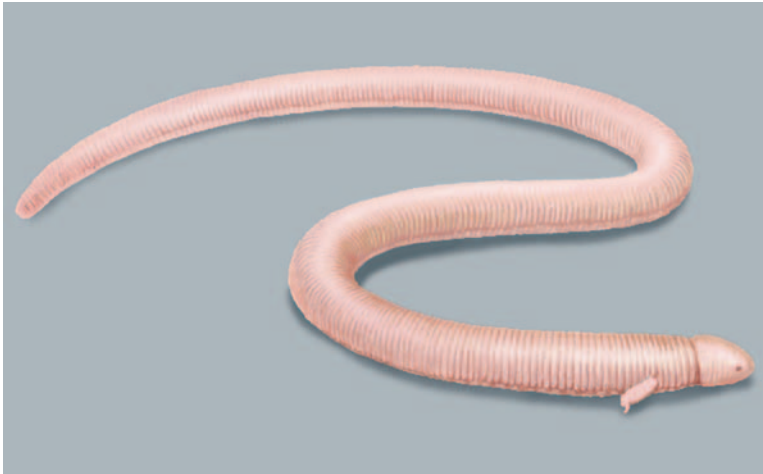
SPECIES ACCOUNT



TWO-LEGGED WORMLIZARD *Bipes biporus*

Physical characteristics: Colored very pale pink or orangish-pink, and sometimes with a whitish belly, the two-legged wormlizard has two front legs, each with five claws. Adults can reach 7.5 to 8.3 inches (19 to 21 centimeters) long, including a short tail. The tail looks much like the rest of the body but actually begins at the vent, a slit-like opening on the underside of the animal. In this species, the tail is about one-tenth as long as the rest of the body. In other words, a 7.5-inch-long (19-centimeter-long) wormlizard has a tail about 0.75 inches (1.9 centimeters) long. It is a thin animal, and at the middle of its body, it only measures about one-quarter of an inch (6 to 7 millimeters) across.

Geographic range: It makes its home along the western side of the Baja California peninsula in Mexico.



People rarely see these wormlizards, unless they happen to turn over a rock, a pile of leaves, or some other hiding spot where one is lying.

(Illustration by John Megahan. Reproduced by permission.)

Habitat: The two-legged wormlizard lives underground in sandy soils usually around the roots of certain shrubs called mesquite (mess-KEET). Their tunnels are usually very shallow—less than an inch (2.5 centimeters) deep—but they sometimes drop to about 6 inches (15 centimeters) under the surface.

Diet: They search underground for ants, termites, and the larvae (LAR-vee) of insects to eat. Larvae are newly hatched insects that usually have soft bodies. Grubs, for example, are the larvae of beetles. At night, they also look for food, including insects and spiders, above ground.

Behavior and reproduction: These animals stay in their shallow tunnels most of the time. In the mornings, they tend to move up to shallower tunnels, then go deeper as the day warms up. Scientists believe that they also search for warm or cool spots underground by moving into the open where the sun beats down to heat up the sand, or under chillier shady areas beneath shrubs or trees. They will leave their tunnels and come up to the surface sometimes, especially at night, to hunt for invertebrates. They are not speedy, graceful animals. Rather, they move slowly and clumsily, sometimes swinging around their front legs in an overhand swimming type of motion. Like other members of this family, the two-legged wormlizard can drop its tail if it is attacked. They squeeze muscles around a weak spot in the tail bone, and the tail drops off. The wound heals, but the worm lizard cannot grow a new tail.

The females lay one to four eggs in July, which is a very dry time in their habitat. The eggs hatch about two months later, just as the

rainy season starts and food for the young becomes more plentiful. In the summer after the females reach their fourth birthday, they are old enough to have young of their own. Some scientists think that females may only have young once every other year. Only more research will say for sure.

Two-legged wormlizards and people: People rarely see one of these wormlizards, unless they happen to turn over a rock, a pile of leaves, or some other hiding spot where one is lying. The wormlizard usually responds by quickly slipping into a nearby tunnel and disappearing.

Conservation status: This species is not considered endangered or threatened. ■

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family CHAPTER

FLORIDA WORMLIZARD

Rhineuridae

Class: Reptilia

Order: Squamata

Suborder: Amphisbaenia

Family: Rhineuridae

One species: Florida worm lizard
(*Rhineura floridana*)

PHYSICAL CHARACTERISTICS

Florida wormlizards, the only living species in this family, are long and thin creatures without legs. They have thin rings circling their round bodies, no ear openings, and usually no visible eyes. This combination of features makes many people confuse them with earthworms. Florida wormlizards, however, have scales, and worms do not. In fact, it is the scales on the wormlizard's head that cover its eyes. The head is hard and somewhat flattened with a bladelike front edge, which helps the lizard to dig into the soil. The upper jaw sticks out farther than the lower jaw, so the animal has an overbite of sorts. The shape of the head has caused some people to call them shovelnose wormlizards. They are usually a pearly pinkish white color, but some individuals may be tinted slightly orange-pink. Their heads and tail tips are sometimes a bit darker. Like most snakes, they shed their skin—actually just the top layer of skin—in one piece.

Adults can grow to about one-half inch (1.2 centimeters) around at the middle of the body and reach 9.5 to 11 inches (24 to 28 centimeters) long, including a short tail. The tail begins at the vent, a slit-like opening on the underside of the animal, and is only about one-tenth of the total length of the wormlizard. The tail, which is slightly flattened, is covered on top with little cone-shaped bumps called tubercles (TOO-ber-kuls).

Inside the body, Florida wormlizards look much like other types of wormlizards, which are all grouped together under the name amphisbaenians (am-fizz-BAY-nee-ens). The

phylum

class

subclass

order

monotypic order

suborder

▲ **family**



A GREATER PAST

The only species of the family Rhineuridae makes its home in parts of Florida and in southern Georgia, but this family once lived over a much larger area. Scientists have identified fossils from wormlizards in the central and western United States. These fossils, which date back as much as 60 million years ago, tell scientists that the wormlizards of the past looked quite similar to the Florida wormlizard alive today. They also were a little different. For example, while they had the same flattened and somewhat pointy skull that the current species has, the fossil worm lizards also had at least one bony feature that Florida wormlizards lack. In their skulls, the fossil wormlizards have orbit and jugal (JEW-gul) bones, that form a complete ring around the eye.

amphisbaenians include four different families of wormlizards: the Rhineuridae, or Florida wormlizards; the Bipedidae, or mole-limbed wormlizards; the Trogonophidae, or spade-headed wormlizards; and Amphisbaenidae, which are known simply as worm lizards. The Florida wormlizard is the only amphisbaenian that naturally lives in the United States. The others live in Africa, Central and South America, and a few places in Europe and Asia. All amphisbaenians are long, thin reptiles that look much like worms, but with scales. They have an odd ear set-up in which parts of the ear attach to tissue on the sides of the face. When the ground vibrates, the tissue senses the vibrations and sends them on to the ear, so the animal can actually hear the ground move. In addition, amphisbaenians have two lungs like almost all other vertebrates (pronounced VER-teh-brehts), which are animals with backbones, but one of their lungs is either extremely small or missing altogether. This arrangement works well in these species, and indeed in many snakes, that have very thin bodies without room for two side-by-side lungs. They also have a forked tongue, no visible ear holes, and one center tooth in the front of the

upper jaw that is bigger than the other teeth. The Florida wormlizards sometimes have one little tooth on either side of the center tooth. Florida wormlizards also have their nostrils toward the bottom of the head rather than on the top as many other reptiles do.

GEOGRAPHIC RANGE

Once thought to live only in north-central and northeastern Florida, scientists now know that it also exists in southern Georgia.

HABITAT

Florida wormlizards make their homes in the sandy and loose but rich soil of usually dry pine and broad-leaved forests. They

are burrowing animals and therefore spend most of their time underground. When heavy rains drench the forests, these worms often leave their tunnels and venture out above ground. Because people usually only see them after a downpour, they sometimes call the animals thunderworms.

DIET

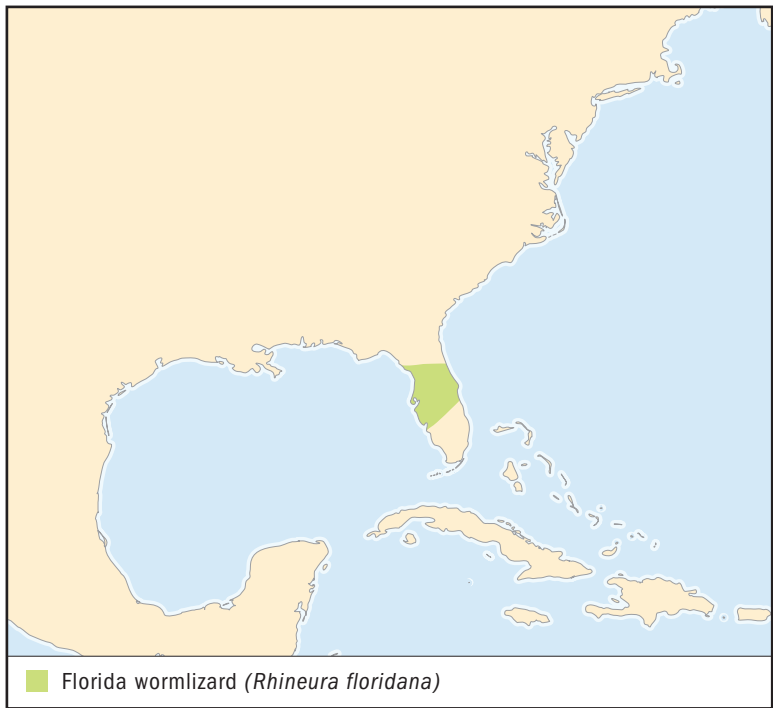
Scientists are unsure exactly what Florida wormlizards eat, but they believe they probably eat the same things that other amphisbaenians eat. Most amphisbaenians travel through their underground burrows looking for and dining on the ants, termites, and grubs that they find there. The Florida wormlizards flick their forked tongues to pick up chemicals in the air and on the ground. They then press the tongue on the roof of the mouth, where a special organ, called a Jacobson's organ, lies. This organ "tastes" the chemicals to tell the wormlizard about the prey animals that might be nearby. They also use their special ear set-ups to "hear" even very faint vibrations in the ground. This super-hearing ability probably helps the wormlizards to hear movements made by even very small insects and therefore makes them especially good hunters.

BEHAVIOR AND REPRODUCTION

Florida wormlizards stay underground most of the time, although they sometimes—and just for a moment—poke their heads up and out of piles of leaves. Scientists call such underground-living animals fossorial (faw-SOR-ee-ul). Florida wormlizards dig through the soil with their hard, shovel-shaped heads. The snout is also very hard and forms a sharp edge for tunneling. Although its tail is short, the Florida wormlizard uses it well. As the wormlizard begins digging, its tail is often exposed on top of the ground. Fortunately, dirt fits between the cone-shaped bump on the top of the tail and helps to hide it from the sight of passing predators (PREH-duh-ters), or animals that might hunt it for food. If a predator comes too close, the wormlizard quickly digs further into the soil and uses its tail like a cork to plug the tunnel entrance. Unlike many lizards, the Florida wormlizard cannot drop its tail.



Florida wormlizards stay underground most of the time. (©Dave Norris/Photo Researchers, Inc. Reproduced by permission.)



Female Florida wormlizards lay eggs, usually two at a time, in their underground burrows. The eggs hatch into babies about 4 inches (10 centimeters) long. Scientists know little else about their courtship, mating, or reproduction.

FLORIDA WORM LIZARDS AND PEOPLE

People rarely see these shy animals, but they may get some benefits from the wormlizards. If they eat ants, termites, and beetle grubs, the wormlizards may be helping to rid gardens and parks of some of humankind's pests.

CONSERVATION STATUS

This species is not considered endangered or threatened.

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SPADE-HEADED WORMLIZARDS

Trogonophidae

Class: Reptilia

Order: Squamata

Suborder: Amphisbaenia

Family: Trogonophidae

Number of species: 8 species

family

CHAPTER

phylum

class

subclass

order

monotypic order

suborder

▲ family

PHYSICAL CHARACTERISTICS

At first glance, the spade-headed wormlizards look like big earthworms. Just as earthworms have rings around their bodies, these wormlizards have thin rings from the back of the head to the tip of the tail. Such rings are called annuli (ANN-you-lie). In the spade-headed wormlizards, the rings are made of tiny square-shaped scales that are the same size and shape from the belly to the back. Also like earthworms, the wormlizards have no legs. Wormlizards, however, do still have tiny leftover hip and shoulder bones inside their bodies.

The heads of spade-headed wormlizards are shaped like shovels, or spades, which gives them their name. Sometimes, people also call them by another common name, short-headed wormlizards, because their heads are quite small and end quickly after the neck. The edges of the face are quite sharp, providing an excellent digging tool for these burrowing animals. The body is flattened into an upside down “U” shape, so that the wormlizard has a rounded back and an inward-curved belly side. It has a very short, sometimes ridged, or keeled, tail. The tail begins at the vent, a slit-like opening on the underside of the animal.

Some spade-headed wormlizards are patterned with checks and spots. They are rather small animals, with adults ranging from 3.1 to 9.4 inches (8 to 24 centimeters) in length.

GEOGRAPHIC RANGE

They live in northern Africa, in eastern Somalia, and in the Middle East from western Iran to the island of Socotra,

which lies east of Somalia and south of Saudi Arabia.

HABITAT

Spade-headed wormlizards tunnel in loose soils, which may be sandy or loamy. A loamy soil is one that is not quite as grainy as sand but still is quite loose.

DIET

Most of the spade-headed wormlizards eat termites, grubs, and ants. Grubs are actually young beetles, which are also known as beetle larvae (LAR-vee). When the grubs are old enough, they go through another life stage called pupae (PYU-pee) and then turn into the adult crawling beetles familiar to most people. Wormlizards in captivity will also eat larger animals by biting off chunks and chewing them up. Scientists are unsure if they eat larger animals in the wild because they have never seen a wild wormlizard eating a larger animal. On the rare occasions when they have been able to catch and cut open a wild wormlizard to check its stomach and see what it had been eating, scientists have not found pieces of large animals inside. Until more studies on wormlizards are done, scientists cannot say for sure whether they eat larger animals in the wild.

BEHAVIOR AND REPRODUCTION

These wormlizards move oddly when they are tunneling. Instead of forcing their heads forward into the soil, they turn their heads up on one side and then up on the other, scraping the sharp sides of the face in this back-and-forth swiveling motion, and scrape away dirt. Just as twisting an apple corer will cause the corer to cut into and through an apple, swiveling the head of one of these wormlizards slices into the soil to make a tunnel. This swiveling motion is known as oscillation (AH-sih-LAY-shun). Besides cutting through the soil, the oscillation packs the dirt against the sides of the tunnel to make it smooth and rather strong. Although the head turns back and forth, the rest of the wormlizard's body does not. Its body's upside down



LIZARD EARS

On a person, a dog, or a cat, the ears are obvious. They are called “external” ears because external means something that is on the outside. Some animals, including many reptiles, have no external ears. Instead, their ears are often little more than holes on the sides of the head. Some species do not even have the holes. They are covered with scales. Spade-headed wormlizards are an example of reptiles without external ear openings. They can, however, still hear and are especially good at hearing vibrations in the soil. Such vibrations could be made by a predator walking overhead or a prey animal moving about.

“U” shape helps the wormlizard grab hold of the soil with its belly side and keep its body still. In addition, its very short tail digs in to the bottom of the tunnel to hold the body in place while the head swivels.

Because they have tiny eyes, if they have them at all, these wormlizards do not rely on vision to find their prey. Instead, they have excellent senses of hearing and smell. Although their ears are hidden by scales, they can hear even small movements, like a termite taking a few steps somewhere else in the soil. They also stick out their forked tongues to pick up chemical odors, then draw the tongue back inside the mouth to touch a special organ on the roof of the mouth. This organ, called the Jacobson’s organ, smells the chemical odor.

Their underground homes provide considerable protection against predators (PREH-duh-ters), or animals that hunt other animals for food. Sometimes, when they are on the surface, however, they may face a predator. Unlike wormlizards in other families, the spade-headed wormlizard cannot drop the tail, a tactic that other species use to escape attackers. Instead, wormlizards roll over to be belly-up, and they stop moving. Predators may be surprised by the color or the belly or may lose interest because the wormlizard is so still. Either way, this behavior apparently helps the wormlizard to live another day.

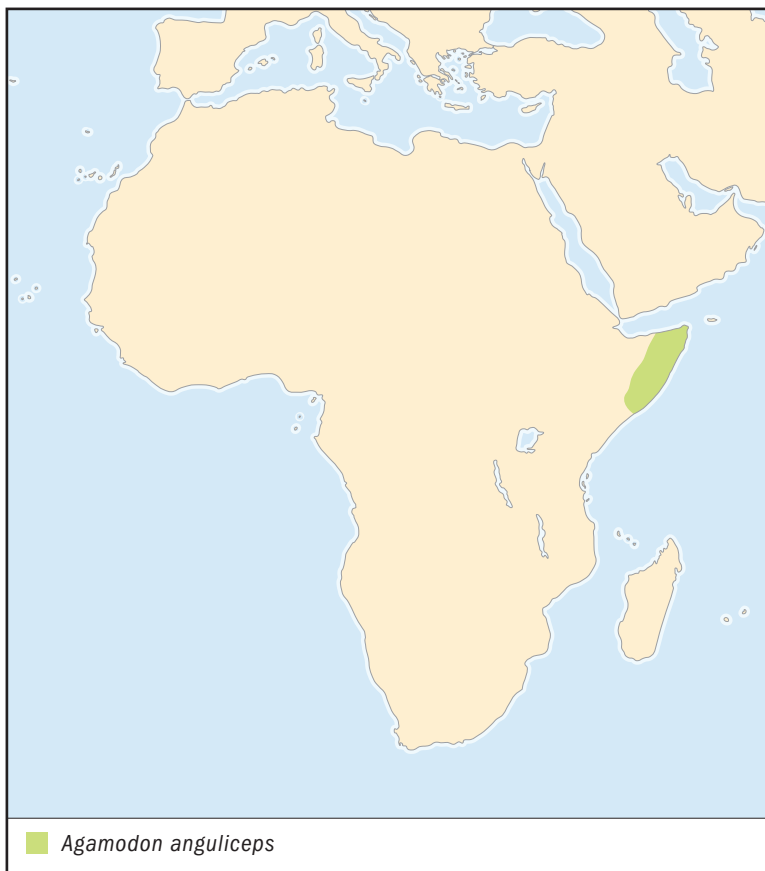
The females of some species of these wormlizards give birth to about five baby wormlizards at a time. Scientists believe that some other species lay eggs. Little else is known about the courtship, mating, or reproduction of these animals.

SPADE-HEADED WORM LIZARDS AND PEOPLE

Although people rarely see these wormlizards, they may be helpful to people because they eat pest insects such as ants and termites that might damage the wood in buildings or cause other problems for people.

CONSERVATION STATUS

These species are not considered endangered or threatened, but scientists know little about them in the wild.



NO COMMON NAME
Agamodon anguliceps

**SPECIES
ACCOUNT**

Physical characteristics: *Agamodon anguliceps* has a short shovel-shaped head and a sharp-sided face. Its back is mottled with yellow and dark brown to brownish purple blotches, and its underside is pink to purplish pink. Its tiny squarish scales form rings around its body. It grows to about 4 to 8 inches (10 to 18 centimeters) in length.

Geographic range: This species lives in eastern Ethiopia and Somalia along the eastern edge of central Africa.

Habitat: They tunnel in loose and sandy soils.

Agamodon anguliceps lives in eastern Ethiopia and Somalia along the eastern edge of central Africa. (Illustration by John Megahan. Reproduced by permission.)



Diet: Scientists have not studied this animal in the wild, but they suspect that it eats termites, grubs, and other invertebrates (in-VER-teh-brehts), which are animals without backbones. In captivity, however, this wormlizard can also attack and kill larger vertebrate prey, which they then eat by biting off and chewing up the pieces. Vertebrates (VER-teh-brehts) are mammals and other animals that have backbones.

Behavior and reproduction: Like other members of this family, this species digs its tunnels by swiveling its head and using the sharp sides of its face to slice through the soil. It appears to stay closer to the surface of the ground during the night and move deeper into the soil in the daytime. When it feels threatened, it flips onto its back to show off its pink underside and then plays dead. Scientists know almost nothing about its reproduction, but they believe that the females probably lay eggs.

***Agamodon anguliceps* and people:** People and this wormlizard rarely see one another.

Conservation status: This species is not considered endangered or threatened, but scientists know little about them in the wild.

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Student Animal Life Resource



Reptiles

volume 2

Night lizards to Cobras, Kraits, and their Relatives

Leslie A. Mertz, PhD, author

Madeline S. Harris, project editor
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family CHAPTER

NIGHT LIZARDS

Xantusiidae

Class: Reptilia

Order: Squamata

Suborder: Scincomorpha

Family: Xantusiidae

Number of species: 23 species

PHYSICAL CHARACTERISTICS

The night lizards are mainly small lizards without the working eyelids that many other species of lizards have. Instead, the night lizards have a see-through scale covering the eye. This clear scale, which looks somewhat similar to a person's contact lens, is called a spectacle. Beneath the spectacle, the eyes of some species of night lizards have catlike pupils, but others have round pupils. The typical night lizard has a low flat body, which allows it to sneak easily into cracks of rocks or into narrow openings between plant leaves.

The bodies of these lizards are covered with small scales, except on the head and belly. The top of the head is covered with large plates, and wide rectangular scales stretch across the belly. Most have drab-colored bodies, usually brown or gray, but a few have striking patterns. The granite night lizard, for example, has a spotted leopard-style pattern of brown spots on an otherwise yellowish body. Some have round and bumpy scales that give the lizard's back the look of a tiny beaded purse. Some night lizards are quite small, reaching only 1.5 inches (3.7 centimeters) long from the tip of the snout to the vent, a slit-like opening at the beginning of the tail and on the underside of the lizard. Adults of the largest species, the yellow-spotted night lizard, grow to more than three times that size, reaching 5 inches (12.7 centimeters) long from the snout to the vent. The typical night lizard has a tail as long or slightly longer than its body.

GEOGRAPHIC RANGE

Night lizards live in the United States, Cuba, and Mexico, as well as in Central America as far south as Panama.

phylum

class

subclass

order

monotypic order

suborder

▲ **family**



NIGHT LIZARD CONFUSION

To figure out how closely some animals are related to other animals, scientists can look at a number of characteristics, such as certain bones that are alike or different. Sometimes scientists find it difficult to decide on the closest relatives of species, including the night lizards. The species in this family have characteristics that are similar to four different families: the geckos, the skinks, the whiptails and tegus, and the wall and rock lizards. So far, scientists have not decided for sure which family the night lizards are most like. They do agree, however, that the night lizard family is an ancient one that dates back more than fifty million years.

HABITAT

Each night lizard species is very picky about where it makes its home. Some species live only in very dry areas, like rocky deserts. Others only live in the rotting parts of certain types of plants or in the dead leaves or decaying logs laying on the ground in a rainforest. Some night lizards even prefer life in a cave. Although members of the family live in North America, Central America, and Cuba, they stay in small areas within that range. For example, the only part of the United States that is home to night lizards is the Southwest, and the Cuban night lizard makes its home in a tiny part of Cuba, where it lives under rocks or buried in soil in areas of dry warm forest.

DIET

Many night lizards, like the Cuban night lizard, eat insects and spiders. The yellow-spotted night lizard also eats scorpions and other invertebrates (in-VER-teh-brehts), which are animals without backbones. Others, such as the island night lizard, eat at least

some seeds and other bits of plants. Scientists are unsure if any species are strict vegetarians that eat only plants. Species in this family search for food where they live. For example, a yellow-spotted night lizard that lives in rotting logs usually looks there for its next meal.

BEHAVIOR AND REPRODUCTION

People rarely see night lizards during the daytime, but they actually can be active both night and day, if the daytime temperatures are not too hot. Even on the best of days, however, they spend most of their time out of sight under dead leaves, inside plants, or in the cracks of rocks. They are much more likely to venture outside at night, when they may scramble about under the cover of darkness. Scientists still know very little about the behavior of night lizards.

Females of all night lizard species, except one, give birth to baby lizards. The typical litter holds five to eight babies. The

Cuban night lizard is the only species in this family that lays eggs. The female lays a single egg at a time, dropping it into a hole. The egg hatches two months later.

In most lizard species, a female becomes pregnant only after she mates with a male. Some night lizards do not follow this rule, and the females can become pregnant on their own. Among female yellow-spotted night lizards, some mate with males to become pregnant, but others may not even see males. Some groups of yellow-spotted night lizards that live in Costa Rica and Panama are made up of only females. With no males in sight, the females are able to become pregnant themselves and have perfectly healthy babies.

NIGHT LIZARDS AND PEOPLE

Although some people believe they are venomous, night lizards are not. They are harmless to humans.

CONSERVATION STATUS

According to the World Conservation Union (IUCN), one species of night lizard is Vulnerable, which means that it faces a high risk of extinction in the wild. The U.S. Fish and Wildlife Service lists the same species, the island night lizard, as Threatened, which means that it is likely to become endangered in the foreseeable future. The island night lizard is at risk because people have brought pigs and goats to the three small Channel Islands where the lizard lives. These much larger animals eat the plants that the lizards use as their homes. Efforts are now under way to remove pigs and goats from at least one of the three islands. Although no other species have been named as being at risk, many night lizards are threatened by habitat destruction. When humans cut down rainforests, remove plants, or otherwise destroy the places where the lizards live, whole populations of these animals can disappear.

SPECIES ACCOUNT

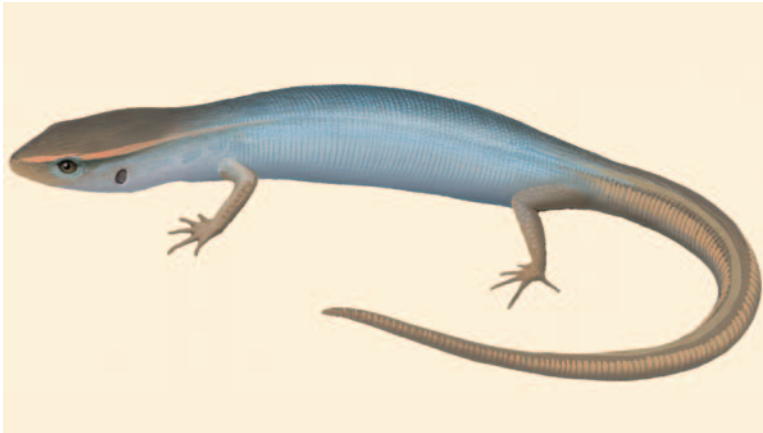


DESERT NIGHT LIZARD *Xantusia vigilis*

Physical characteristics: Among the smallest species in this family, the desert night lizards grow to only 1.5 inches (3.7 centimeters) long from the tip of the snout to the vent. Like other night lizards, they have no working eyelids. This lizard usually has dark spots on its brown back, although in some areas, the back may have a green, yellow, or orange tint. Its skin is typically wrinkly on the neck and along the sides of the body.

Geographic range: This species makes its home in small areas within the southwestern United States and northwestern Mexico.

Habitat: The desert night lizard also goes by the common name yucca night lizard, because it spends much of its time in clumps of



Desert night lizards like to stay hidden in yucca or agave plants. (Illustration by John Megahan. Reproduced by permission.)

rotting yucca (YUCK-uh) plants. It also lives in old, dead agave (uh-GA-vee) plants.

Diet: The desert night lizard eats ants and beetles and occasionally some other insects that it finds in the plants where it lives.

Behavior and reproduction: This lizard likes to stay hidden in yucca or agave plants. Males and females mate in late spring, and about three months later, the females have their young. The typical brood includes one to three baby lizards. Sometimes, if the weather is especially dry, females may skip a year between births.

Desert night lizards and people: Although desert night lizards can be very numerous in some places, with twelve thousand individuals in an area of just one square mile (or four thousand in a square-kilometer area), people rarely see this shy lizard. Humans can, however, harm the lizard populations by cutting down and removing yucca and agave plants, which often happens when they clear land to make way for houses.

Conservation status: This species is not considered endangered or threatened. ■

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family CHAPTER

WALL LIZARDS, ROCK LIZARDS, AND RELATIVES

Lacertidae

Class: Reptilia

Order: Squamata

Suborder: Sauria

Family: Lacertidae

Number of species: at least 225 species

PHYSICAL CHARACTERISTICS

The wall and rock lizards, and their relatives, are small to medium-sized lizards with strong legs, especially the larger back pair, and usually very long tails. The typical wall or rock lizard has small beaded scales on its back and large square or rectangular scales on its belly. They come in many different colors and patterns from an almost entirely green or drab brown body to a bluish body with black blotches, a body split into a red front and black-and-white speckled back, or a black and cream striped body and red legs. Some species have brightly colored tails, which attract the attention of predators (PREH-duh-ters), or animals that hunt them for food. Fortunately, the lizards can easily drop their tails if they are attacked, allowing the lizard, minus its tail, to escape. In many species, the males have more spectacular colors than the females, and males in some species become even more brilliantly hued during the mating season.

The average adult grows to less than 8 inches (20 centimeters) long from head to tail, although a few species in this large family can reach 20 inches (50 centimeters) in length. Of their total length, much can be tail. In some species, such as the oriental six-lined runner, three-quarters of their overall length is tail.

GEOGRAPHIC RANGE

Wall and rock lizards live in Europe, Asia, Africa, and the East Indies.

phylum

class

subclass

order

monotypic order

suborder

▲ **family**

HABITAT

Wall and rock lizards are very common in dry areas, such as deserts, but some species make their homes in forests or in very cold areas, such as grasslands high up in the mountains or in far northern lands inside the Arctic Circle. They are also found on some Atlantic Ocean islands, including the Canaries off northern Africa, Sri Lanka (or Ceylon) off the southern tip of India, and the British Isles.

DIET

The bellies of these lizards are usually filled with insects, which they typically capture by sitting very still in one spot—usually in the shade—until an insect wanders by. They then spring out and grab the tasty morsel. This type of hunting is called ambush. The western sandveld lizard is unusual because while it eats some insects, its main diet is scorpions, which the lizard finds by looking for their tunnel entrances and digging them out of the ground. Some species in this lizard family also eat seeds and fruit in addition to insects. A few, including the adult giant lizards that live in the Canary Islands, are unique in that they eat almost only plant material.

BEHAVIOR AND REPRODUCTION

Active during the day, wall and rock lizards typically like to sunbathe, or bask, to warm up their bodies. Most of them bask out in the open on rocks or on the ground. Some, such as Asian grass lizards, climb into plants and bushes and use their very long tails to wrap around stalks and branches. A few species, like the western sandveld lizard, stay in underground burrows most of the time.

Usually the lizards are able to avoid predators by keeping careful watch and running for cover before an attacker can come too close. The shovel-snouted lizard is even able to dive into the sand of its desert home and bury itself. This lizard scoots even deeper when it wants to take a cool and safe nap. Young Kalahari sand lizards have another defensive tactic. These baby lizards look so much like a bad-tasting beetle, known as the oögpister, that predators avoid them. Despite these behaviors, however, attackers are sometimes able to approach wall and rock lizards closely enough to attack them. When this happens, a wall or rock lizard can drop its tail, leaving the tail for the predator while the lizard escapes. A replacement tail grows, but it is usually much shorter.

Almost all the lizards in this family lay eggs and usually fewer than ten at a time. A female digs a hole in the ground and lays her eggs there. In many cases, the mother digs the nest under a rock that is out in the open and can warm up in the sun. The underground soil keeps the soft-shelled eggs moist. She then leaves the nest; the eggs hatch later, and the young are on their own. The largest females lay the most eggs, with some female eyed lizards giving birth to twenty eggs at a time. The females of a few members of this family have baby lizards rather than eggs. This includes the viviparous (vie-VEE-puh-rus) lizard, which lives in northern Europe. Females of this species mate with the males in the spring to early summer and have four to eleven babies three or four months later. Seven species in this family are all females, but they can still have babies, which are also all females.

WALL LIZARDS, ROCK LIZARDS, THEIR RELATIVES, AND PEOPLE

People usually leave these lizards alone, but long ago, some humans hunted and ate the giant lizards of the Canary Islands.

CONSERVATION STATUS

According to the World Conservation Union (IUCN), Simony's giant lizard is Critically Endangered, which means that it faces an extremely high risk of extinction in the wild. This giant lizard is so rare that scientists actually thought it was extinct until a small population turned up in 1975 high in the cliffs of El Hierro, one of the Canary Islands. Another species, called the Gomeran giant lizard, was similarly thought to be extinct until 2001 when a population was discovered in the Canaries. It may be even more rare than Simony's giant lizard, but the IUCN has not yet listed it as being at risk. The greatest predators to these lizards are cats and rats, which were both brought to the islands by humans.

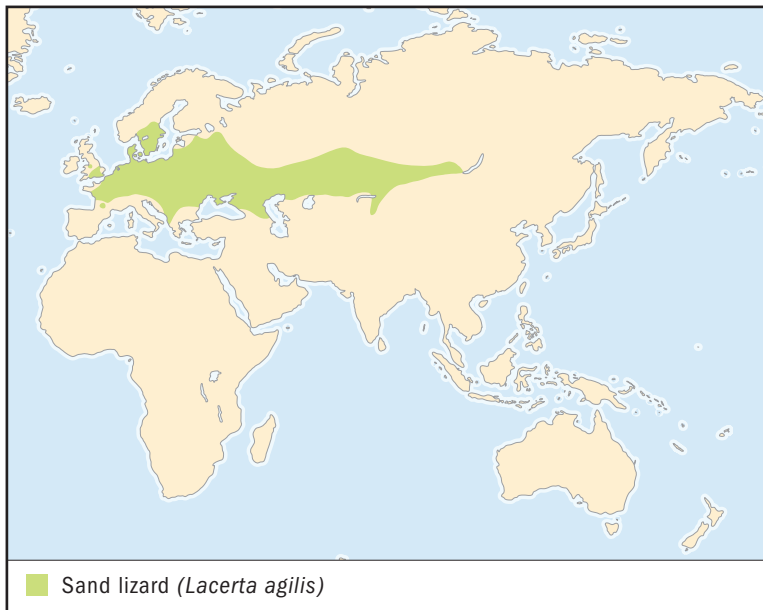
In addition to Simony's giant lizard and the Gomeran giant lizard, the IUCN has listed Clark's lacerta as Endangered, which



A LOSING TAIL

Many lizards, including the wall and rock lizards of the family Lacertidae, can drop their tails when they are attacked. The dropped tail wiggles around on the ground and draws the attention of the attacker while the lizard runs for its life. Wall and rock lizards can drop their tails because their tails are made of a series of small bones that have weak points between them. The lizard also has a ring of strong muscles around each weak point. When attacked, the lizard squeezes the ring of muscles so tightly that the weak point in the tail snaps and the tail falls off. After it drops, nerves in the tail continue to work sometimes for many minutes, and the tail busily squirms along the ground. Eventually, the tail stops moving, but by then, the lizard is long gone.

means that it faces a very high risk of extinction in the wild, and five others as Vulnerable, which means that they run a high risk of extinction in the wild. The U.S. Fish and Wildlife Service lists the Hierro giant lizard as Endangered, or in danger of extinction throughout all or a significant portion of its range, and the Ibiza wall lizard as Threatened, or likely to become endangered in the foreseeable future.



SAND LIZARD

Lacerta agilis

SPECIES ACCOUNT

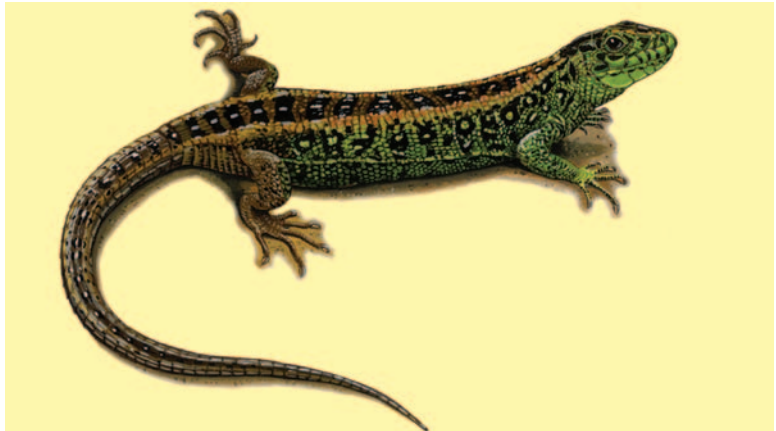
Physical characteristics: One of the larger members of this family, the biggest sand lizards can grow to almost 12 inches (30 centimeters) long from the tip of the head to the end of their long tail. Most, however, reach only about 8 inches (20 centimeters) long. In the eastern part of its range, the sand lizards may be greenish, but western lizards are usually brown or gray with dark spots and/or stripes. Males of the western sand lizards also show some green along their sides and on their bellies and become brighter green during the mating season.

Geographic range: The sand lizard lives in spotty areas throughout Europe and Asia, from the British Isles to China, and as far south as Greece.

Habitat: The sand lizard is common in places with sandy soils, such as sand dunes and brushy areas, but it can also make its home in clay-type soils along forest edges and in fields and gardens.

Diet: It lives mostly on insects, which it hunts by looking for them while skittering through cover in its habitat. It will also sometimes

This shy lizard often darts into holes or tunnels it finds among plant roots when it feels the least bit threatened. (Illustration by Gillian Harris. Reproduced by permission.)



eat worms and other invertebrates (in-VER-teh-brehts), which are animals without backbones, as well as fruit and flowers, and once in a while even another sand lizard.

Behavior and reproduction: The sand lizard is active during the day and will run through brush above ground or bask in warm spots, but it usually stays out of sight. This shy lizard often darts into holes or tunnels it finds among plant roots when it feels the least bit threatened. Numerous sand lizards may live together in the same area. In colder climates, they will hibernate from fall to early spring.

During the breeding season in the spring, the males turn into fighters and will battle one another over the chance to mate with a female. The fights usually involve the males grasping each other's necks, and then wrestling until one gives up and leaves. After mating with a male, a female finds a sunny spot where she digs a hole and lays three to fourteen eggs. She provides no care for the eggs or her young. In forty to sixty days, the eggs hatch.

Sand lizards and people: Humans and this lizard rarely see one another.

Conservation status: Although neither the IUCN nor the U.S. Fish and Wildlife Service list this species as threatened, some populations are at great risk because of the destruction of their habitat. In western Europe, the lizards typically live in heathlands, which are open areas covered with low plants and shrubs. When the heathlands are destroyed to make way for homes or other human development, the lizards disappear. ■

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MICROTEIIDS

Gymnophthalmidae

Class: Reptilia

Order: Squamata

Suborder: Lacertiformes

Family: Gymnophthalmidae

Number of species: At least 175
species

family

CHAPTER

phylum

class

subclass

order

monotypic order

suborder

▲ family

PHYSICAL CHARACTERISTICS

The microteiids are very small lizards, with adults usually only growing to 2.3 inches (6 centimeters) long from the tip of the snout to the vent, which is a slitlike opening between the two hind legs on the underside of the lizard. Their tails come in different lengths depending on the species, but they are typically about one and one-half times the length of the body from snout to vent or longer. All species in this family can easily break off the tail and grow a new one. Most, but not all, have four working legs. The eighteen species in the group, or genus (*GEE-nus*), called *Bachia* have tiny legs, and those in the genus *Calyptommatus* have no legs at all. A genus is a group of similar species. Although the microteiids spend much of their time hidden in dark places, they have well-formed eyes.

Many species in this family have small scales on their backs and larger scales on their undersides. Some species have ridges, or keels, on their back scales, and some have smooth unkeeled scales. Many have backs in shades of brown or black, and some have stripes or spots. In a few species, such as the golden spectacled lizard of Costa Rica, the tail may be a different color than the rest of the lizard.

GEOGRAPHIC RANGE

Microteiids live in southern Mexico, in Central America, on the Caribbean islands, and throughout much of South America, where they reach as far south as north-central Argentina.

HABITAT

The microteiids live in tropical forests, often by water. They usually stay out of sight under piles of leaves, beneath logs, or in other hiding places and will often dive into the water to escape predators (PREH-duh-ters), or animals that hunt other animals for food.

DIET

These lizards are mainly active during the day and spend much of their time rooting around in leaves and along the ground to find their favorite food insects. They see and smell well and likely use these characteristics to help them find food and to escape predators.

BEHAVIOR AND REPRODUCTION

Although this family has at least 175 species, their small size and tendency to remain hidden has helped to keep much of their behavior a secret from scientists. Some have, however, been seen wandering along the forest floor and along the shores of streams and swamps looking for insects to eat. When they feel threatened by an attacker, they will run to the water, where they dive in and swim off. Many have flattened tails, which help them swim quickly through the water. Unlike most other lizards, which sunbathe, or bask, out in the open during the day to warm their bodies, the microteiid lizards apparently do not. Instead, some appear to heat up their bodies by finding a sunny spot and crawling under leaves there.

Those species that have been studied are all egg layers, and scientists believe that the females only have one or two young at a time but lay eggs more than once a year. Some of the species are all female, which means that they can and do have babies without mating with males. Species that do this are called parthenogenic (PAR-thih-no-JEH-nik). This is rather unusual among lizards and among other vertebrates (VER-teh-brehts),



WHAT GOOD ARE THEY?

Scientists do not understand just how important each individual species is to life on Earth. Over the years, the most-studied animals are those that humans find cute and/or want for pets, like dogs and cats; that people find useful, like cows for meat and horses for farm chores; or bothersome, like mosquitoes that transmit disease. Scientists know much less about other species that lack these traits and that stay out of sight. The microteiid lizards are an example. They are small lizards that hide in piles of leaves and rarely come across a person. Even these species, however, are important to the web of life on the planet. For example, numerous predator species probably eat them, and they in turn eat many different types of insects, which eat other animals and plants, and so on. If the microteiid lizards were to disappear, it is possible that the surrounding environment would change so much that it would cause harm to the other animals and plants that live there. This is also true of other species on Earth. No animal or plant lives and dies without having an effect on some other living thing.

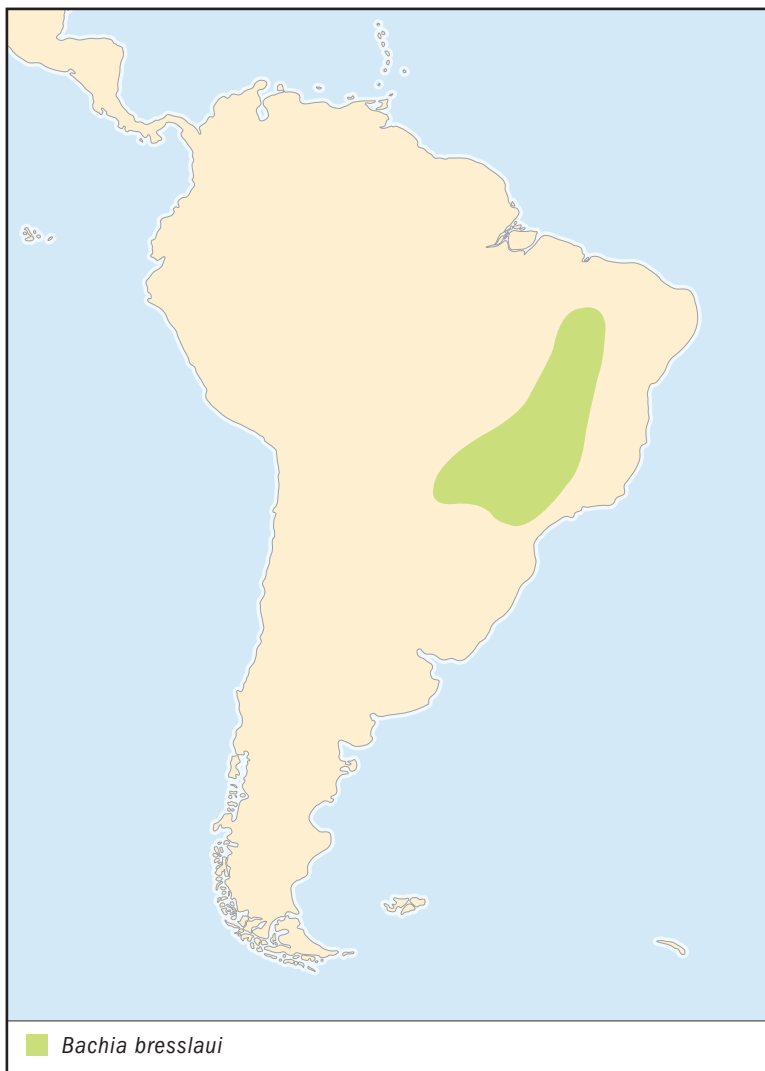
which are mammals, birds, and other animals with backbones. Most vertebrates require that a female and male mate before the female becomes pregnant. In the microteiid lizards, however, a female can become pregnant without ever seeing a male and produces babies that are her exact duplicates. Such exact duplicates are called clones.

MICROTEIIDS AND PEOPLE

People and microteiid lizards rarely come across one another. Sometimes, however, people unknowingly dig in their habitat and can harm the lizards.

CONSERVATION STATUS

These species are not considered endangered or threatened, but scientists know little about them. Because they live along the ground, however, and sometimes in very small areas, habitat destruction can wipe out entire populations.

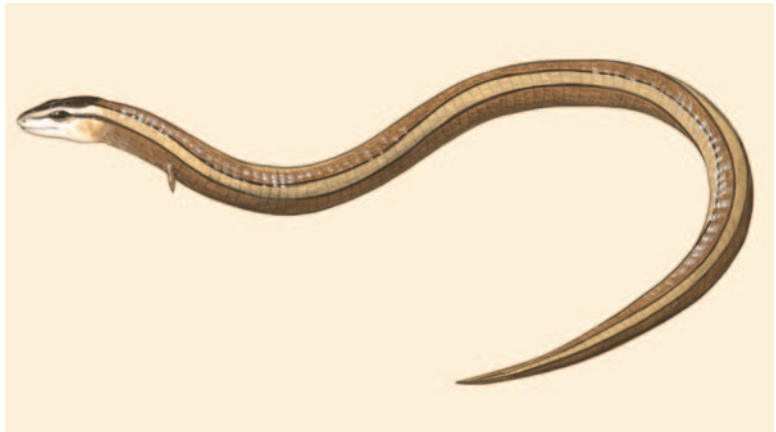


NO COMMON NAME
Bachia bresslaui

**SPECIES
ACCOUNT**

Physical characteristics: This lizard is known only by its scientific name of *Bachia bresslaui*. It has a long body and long tail but very tiny, hardly noticeable legs. Its upper body is gray to brown, sometimes with brown spots, and has a tan stripe down either side. It has a cream-colored underside. Unlike many other lizards that have noticeable

Bachia bresslaui live in the South American countries of Paraguay and Brazil. (Illustration by Barbara Duperron. Reproduced by permission.)



openings on the sides of the head for ears, this species has no such openings. Of the few individuals that have ever been seen, the largest of this rare species of lizards reached a size of 4.2 inches (10.6 centimeters) in length from the snout to the vent, plus a tail that measured more than 6.3 inches (16 centimeters) long.

Geographic range: They live in the South American countries of Paraguay and Brazil.

Habitat: In their range, which includes the northeastern area of Paraguay and central Brazil, these lizards have been found beneath pastures inside tunnels in sandy soils. Scientists think they may live in other types of soil, too.

Diet: Scientists have studied only five individuals from this species. These five ate ants, scorpions, spiders, beetles, and beetle grubs.

Behavior and reproduction: Although very little is known about *Bachia bresslaui*, scientists believe these lizards likely leave their below-earth homes and search about above ground for insects and other things to eat. They may walk with their small legs or slither like snakes. Scientists also guess that the females lay eggs rather than have baby lizards, but they have not yet found the eggs. They are also unsure about how many eggs the lizards lay at a time.

***Bachia bresslaui* and people:** People and this lizard rarely see one another. Humans do, however, sometimes destroy their habitat when they build on or otherwise change the areas where the lizards live.

Conservation status: This species is not considered endangered or threatened. Scientists suspect that this species may actually live in areas other than northeastern Paraguay and central Brazil, but they do not have proof as yet. ■

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family

CHAPTER

WHIPTAIL LIZARDS, TEGUS, AND RELATIVES

Teiidae

Class: Reptilia

Order: Squamata

Suborder: Lacertiformes

Family: Teiidae

Number of species: 18 species

PHYSICAL CHARACTERISTICS

The whiptail lizards, tegus, and other members of this family have long, thin bodies with long legs and narrow heads with noticeable eyes and long, forked tongues. Their tails often stretch one-and-a-half times as long as the rest of their bodies and sometimes more. Some are camouflaged in drab browns, but others are colored in bright greens, reds, and blues. Their overall size may be small or large, depending on the species. In some, the adults are less than 5 inches (12 centimeters) long from the tip of the head to the end of the tail, while other species when full-grown are 4 feet 3 inches (1.3 meters) long from head to tail. In most cases, the males are a bit bigger than the females.

GEOGRAPHIC RANGE

Species of this family live only in the Western Hemisphere, from the United States south through Mexico and Central America to South America. Some species also make their homes on many islands of the Caribbean.

HABITAT

Whiptail lizards, tegus, and other members of this family tend to live in places that have some open areas where they can sunbathe, or bask. Even those that live in seemingly thick forests can find many openings in the tree cover and sit where the sunshine warms the ground. Usually, the larger species tend to make their homes in shadier habitats, while their young and the smaller species live in the sunniest, most open areas. When they aren't basking or looking for food, most species stay underground in

phylum

class

subclass

order

monotypic order

suborder

▲ **family**



NO BOYS ALLOWED

Some species, like the lizard known as the desert grassland whiptail, are all females. Scientists believe that these whiptail lizards actually came about when two different species mated and had young, called hybrids (HIGH-brihds). The hybrids formed a new species of only females. In other species, a female and male must mate to produce young, but in all-female species, the female can produce young by herself. This is called parthenogenesis (PAR-tih-no-JEH-neh-sis). The mother's babies are all identical copies, or clones, of herself. Besides the whiptail family of lizards, seven other families of lizards and snakes have some all-female species.

burrows. Many make their own burrows, but some move into other animals' burrows instead. A few species live near streams and wetlands and often go for a swim. The Paraguayan caiman lizard, for instance, is an excellent swimmer that glides through the water with its powerful tail.

DIET

Most of the whiptails, tegus, and other members of this family will eat nearly any type of insect they find, and some large species will also eat fruit. The tegus eat fruit, too, but will also eat eggs, as well as living or dead animals. The Caiman lizards eat mostly snails, which they find while swimming in streams and swamps. Larger species, such as the giant ameivas that grow to be about 2 feet (61 centimeters) long, will eat small vertebrates (VER-teh-brehts), which are animals with backbones. They will also eat fruit that has fallen to the ground from plants and trees.

The lizards in this family usually hunt for their food with their keen eyesight or with their good sense of smell. Some species can

pick up odors especially well and can even find insects that are buried underground.

BEHAVIOR AND REPRODUCTION

The majority of these species spend their nights in burrows, then crawl out on sunny mornings to bask. Once they are warm, they begin running here and there looking for things to eat. When they get too hot, they find some shade, and when they start to get cold, they soak up the rays in a sunny spot. Often, many individuals will live in the same area, and they usually get along very well. When breeding season starts, however, the males will fight over the females.

All of the females lay eggs, rather than giving birth to babies. Some species lay only one or two eggs, while others lay thirty or more. The largest species have the most eggs, and the smallest species, the least. In addition, the larger older females usually lay more eggs than smaller younger females of the same

species. For instance, a female six-lined racerunner may lay only one or two eggs her first year but three or four her second year. Most females lay their eggs in underground burrows, rotting logs, leaf piles, or some other slightly moist place. Some species drag leaves and other plant bits into their burrows and build nests for the eggs. The females stay with their eggs until they hatch.

Some species in this family are all female—they have no males and do not need them to have babies. The females give birth to young that are clones, which are perfect copies, of themselves.

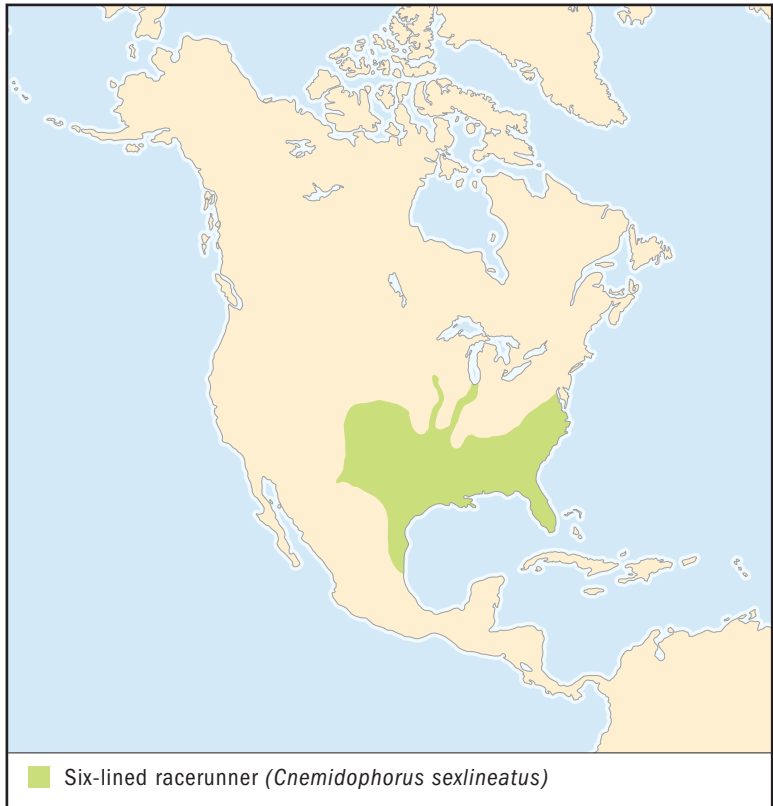
WHIPTAIL LIZARDS, TEGUS, THEIR RELATIVES, AND PEOPLE

Some people hunt these lizards for their meat, fat, and/or skin, and others capture them for the pet trade.

CONSERVATION STATUS

According to the World Conservation Union (IUCN), two species are Extinct, which means they are no longer in existence. In addition, two are Critically Endangered and face an extremely high risk of extinction in the wild, and one is Vulnerable and faces a high risk of extinction in the wild. The IUCN also describes two species as Data Deficient, which means that scientists do not have enough information to make a judgment about the threat of extinction. The U.S. Fish and Wildlife Service also lists two species as Threatened or likely to become endangered in the foreseeable future. Many of the at-risk species naturally have low numbers because they only live on small islands. In this case, habitat destruction and/or collection can wipe out whole populations and possibly entire species.

SPECIES ACCOUNTS



SIX-LINED RACERUNNER *Cnemidophorus sexlineatus*

Physical characteristics: The six-lined racerunner is a handsome and speedy little lizard. Its body is brown to green and has six thin yellow stripes that flow down the body from head to tail. Each stripe is separated from the next with a wide brown to black band of color. In addition, a lighter brown to gray stripe runs down the center of its back. In some populations, the head and neck are brownish, but in others they are yellowish green. Juveniles have blue or blue-green tails. Adults reach about 2.1 to 2.9 inches (5.5 to 7.5 centimeters) in length from their snout to the vent. Including the tail, they can grow to 3.3 inches (8.5 centimeters) in length. Females are usually a bit larger than males.



Six-lined racerunners are extremely fast lizards for their size and quickly dart into burrows, clumps of grass, shrubby undergrowth, or some other hiding spot when they feel even slightly threatened. (©Larry Miller/Photo Researchers, Inc. Reproduced by permission.)

Geographic range: This lizard lives mainly in the southeastern quarter of the United States but also in a few areas of northern mid-western states.

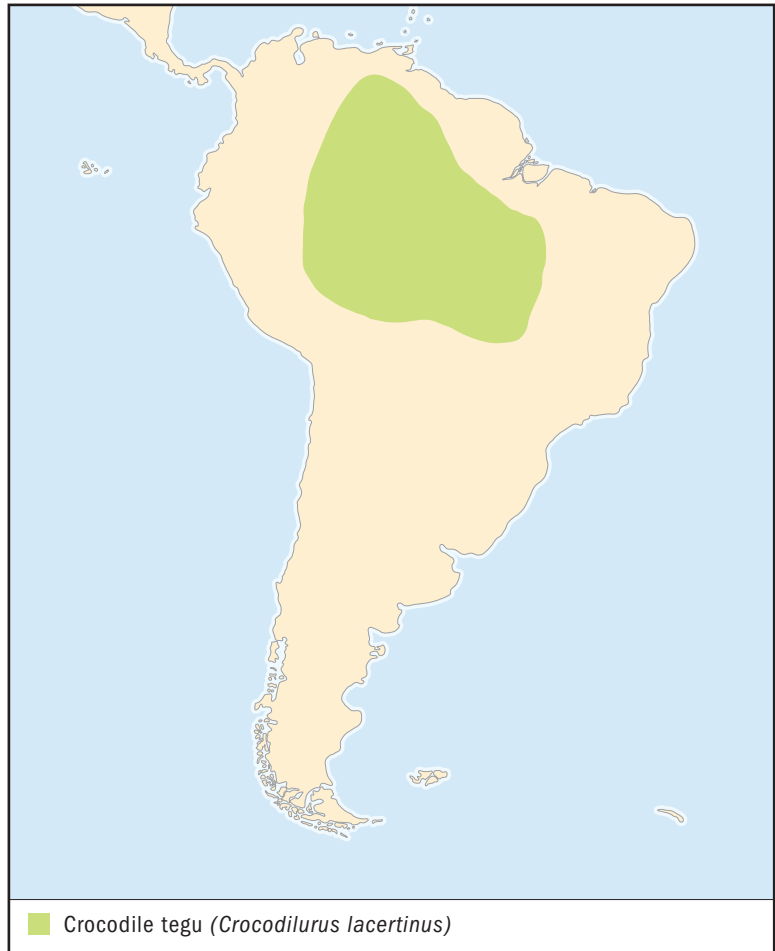
Habitat: This lizard commonly makes its home in sandy areas that have lots of sun but also some shady spots where it can cool off or hide from predators (PREH-duh-ters), or animals that hunt it for food.

Diet: They eat a variety of insects, spiders, and land snails.

Behavior and reproduction: After spending the night in their burrows, these lizards come out in the morning after the sun has warmed the ground. They bask to heat up their bodies and then spend much of the rest of the day looking for food. They are extremely fast lizards for their size and quickly dart into burrows, clumps of grass, shrubby undergrowth, or some other hiding spot when they feel even slightly threatened. They can run almost 18 miles (28 kilometers) an hour. During the breeding season, the chin and chest in some males (those from the western part of the species' range) turn a bluish white, while the females' undersides remain all white. They mate in spring to early summer. Females usually lay one to six eggs, which hatch in early to mid-summer. Some females have a second clutch, or batch of eggs, later in the year. They provide no care for the eggs or the young.

Six-lined racerunners and people: Other than occasionally collecting one for a pet, people generally leave this lizard alone.

Conservation status: This species is not considered endangered or threatened. ■



CROCODILE TEGU

Crocodylurus lacertinus

Physical characteristics: The tail of a crocodile tegu is very long and stretches twice as long as the rest of its body. It also has pointy scales that stand up in a row like those on a crocodile's tail. Adults are mostly greenish brown or brown with a whitish or yellow underside. Their legs have some orange spots. Adults grow to about 19.7 inches (50 centimeters) in length from head to tail.

Geographic range: They are found in South America in the area surrounding the Amazon and Orinoco rivers.



With its crocodilelike tail, the crocodile tegu is an excellent swimmer. (©Jany Sauvanet/Photo Researchers, Inc. Reproduced by permission.)

Habitat: Crocodile tegus wander in the woods and swim in streams.

Diet: They eat almost any insect or spider they can find on land or in the water.

Behavior and reproduction: With its crocodilelike tail, the crocodile tegu is an excellent swimmer. Females lay eggs. Scientists know little about its other behaviors or its reproduction.

Crocodile tegus and people: Humans and crocodile tegus rarely see or bother one another in the wild.

Conservation status: This species is not considered endangered or threatened. ■

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family

CHAPTER

GIRDLED AND PLATED LIZARDS

Cordylidae

Class: Reptilia

Order: Squamata

Suborder: Sauria

Family: Cordylidae

Number of species: 88 species

PHYSICAL CHARACTERISTICS

The plated lizards and the girdled lizards, which have often been separated into their own individual families, are heavy-bodied lizards. The plated lizards have tails that are much longer than the body and are covered with long, rectangular scales. Girdled lizards include the flat lizards, girdle-tailed lizards, and the grass and snake lizards. They have shorter tails that are only about the same length as the rest of the body and are usually covered with spiny scales. The flat lizards have greatly flattened bodies and have few if any spiny scales. The grass and snake lizards have tiny, barely usable limbs that look more like little spines than arms and legs. These lizards slither like snakes.

Many species of plated and girdled lizards are drab-colored and blend into the background. In others, the females and juveniles are dull, but the adult males are brightly and beautifully colored. The girdle-tailed and flat lizards range from 5 to 13 inches (13 to 33 centimeters) in length from head to tail tip; adult grass lizards grow to about 22 inches (56 centimeters) in length, and adult plated lizards reach from 6 to 28 inches (15 to 71 centimeters) in total length.

GEOGRAPHIC RANGE

These lizards live in southern Africa and in Madagascar.

HABITAT

The flat and girdle-tailed lizards, along with many plated lizards, typically make their homes in rocky, dry areas, although

phylum

class

subclass

order

monotypic order

suborder

▲ family



LIZARD DEFENSE

Although lizards are very good at running away to a safe hiding place, predators (PREH-duh-ters) or those animals that hunt them for food occasionally are able to capture one. Many lizards defend themselves by losing their tails — purposely dropping them — and later growing a new one. Most lizards can still run very quickly without their tails and dash for cover while the predator snacks on the discarded tail. Snake and grass lizards also drop their tails quickly when they are attacked, but then they have another problem. Because these lizards do not have working arms and legs, and rely on the tail to slither around, they are quite helpless until the new tail grows in.

some girdle-tailed lizards live in forests where they hide under tree bark or in tunnels. Grass lizards live in grasslands, and plated lizards prefer more shrubby habitats. One species of plated lizard even survives in the sand dunes of a desert, while another lives on the banks of freshwater rivers.

DIET

The species in this family eat almost anything that they can find or catch. The flat and girdle-tailed lizards hunt by ambush, which means that they lie in wait for an insect to wander by. When the insect or other invertebrate (in-VER-teh-breht), which is an animal without a backbone, comes close enough, they rush out to nab it. They will also eat berries and leaves. The plated lizards are not ambush hunters. Instead, they root around through the soil and piles of leaves to find their meals, which are usually invertebrates. Although they can be quite large animals, the plated lizards move very slowly. Nonetheless, they are able to capture small snakes and lizards occasionally for a bigger meal.

BEHAVIOR AND REPRODUCTION

Girdle-tailed lizards, which are all active during the day, are known for the way they defend themselves. When one feels threatened, it scurries into a crack in a rock, blows up its body, and wedges itself in so an attacker cannot reach it. All of the girdle-tailed lizards have very thick scales. When one species, known as the armadillo lizard, is caught too far from a hiding place, it defends itself by rolling into a ball, even grabbing hold of its tail with its teeth, so that the lizard becomes a difficult-to-swallow, scale-covered ball.

When flat lizards feel threatened, their body shape allows them to slide into very thin cracks in rocks and out of harm's way. Snake and grass lizards avoid predators with their speed. Although they don't have legs to help them run, they can move very quickly through the grass, sometimes boosting themselves along by pushing off with their long tails. When an attacker grabs the tail, a snake or grass lizard simply drops it and grows a new one.

One of the most unusual behaviors of the plated lizards is that they sunbathe, or bask, in an odd position. They lay on the belly with their arms and legs held up in the air. When frightened, which happens quite often for this shy species, they quickly run for cover under a bush or in some other hiding place or bury themselves in loose soil by moving their arms and legs as if they were swimming. Sometimes they will stay underground for 24 hours before coming above ground again.

Many species of girdled lizards live in groups for much of the year, but during the breeding season, adult males will set up territories and fight to keep other males away. In many species, these battles are little more than showdowns where the males display their bright belly colors. Female girdle-tailed, snake, and grass lizards give birth to baby lizards instead of laying eggs. Each year, the typical female has one to twelve young, which are old enough to have young of their own when they reach two to four years old. The flat lizards, on the other hand, lay two eggs each year in a damp spot within a rock crack. Unlike the girdled lizards, only a few species of plated lizards live in small groups: Most live alone. Also unlike the girdled lizards, the plated lizards are all egg-layers. Scientists still know little about the details on most species of plated lizards.

GIRDLED AND PLATED LIZARDS AND PEOPLE

Many species are easily frightened and are therefore rarely seen up close by humans. The less-shy lizards, especially the groups of colorful flat lizards, however, make for excellent viewing at parks and other spots in southern Africa.

CONSERVATION STATUS

According to the World Conservation Union (IUCN), one species of plated lizard is Extinct, which means that it is no longer in existence. Only two specimens of this lizard, called the Eastwood's long-tailed seps, are known. In addition, five species of plated and girdled lizards are Vulnerable, which means that they face a high risk of extinction in the wild, and five species are Near Threatened, which means that they are likely to qualify for a threatened category in the near future. Many of them live in tiny areas that are now being developed for other uses. A number of the lizards are also very beautiful, which has made them quite desirable for the pet trade.

SPECIES ACCOUNT



CAPE FLAT LIZARD *Platysaurus capensis*

Physical characteristics: True to their name, the cape flat lizards are very flat animals. The females and juveniles both have a dark brown back with three wide, whitish stripes that run from head to tail. Their bellies are white with a black blotch in the middle. Adult males are much different. The front half of the upper body is bright blue, sometimes with pale spots or stripes, and the back half, including the tail, is brick-red. On the underside, the throat is light blue; the chest, dark blue, and the belly has a black center blotch. Adults range from about 2.5 to 3.3 inches (6.4 to 8.4 centimeters) from the tip of the snout to the vent, which is a slit-like opening on



Cape flat lizards are shy animals that run for cover when humans or other potential predators come too close. (Bill Branch. Reproduced by permission.)

the underside of the lizard at the beginning of the tail. The tail doubles the overall size, for a total length of about 5 to 6.6 inches (12.8 to 16.8 centimeters).

Geographic range: The cape flat lizard lives in the far southwest portion of Africa, in both South Africa and Namibia.

Habitat: They live in those areas of desert that have many rocks.

Diet: This lizard hunts by ambush, laying in wait in a shady spot under a rock until an insect happens by. At that point, it rushes out to nab the insect for a meal. It also eats flowers and berries when they are available.

Behavior and reproduction: Cape flat lizards are shy animals that run for cover when humans or other potential predators come too close. People usually see them from a distance on top of rocks, especially granite ledges. They may live in small groups. Females lay eggs in November or December and sometimes again a couple of months later. Each time, she lays two large eggs in moist soil beneath or in the crack of a rock.

Cape flat lizards and people: Because they live in deserts away from humans, lizards and humans rarely bother one another.

Conservation status: This species is not listed as endangered or threatened. ■

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family CHAPTER

SKINKS Scincidae

Class: Reptilia

Order: Squamata

Suborder: Sauria

Family: Scincidae

Number of species: About 1,400 species

PHYSICAL CHARACTERISTICS

With about 1,400 species, the skinks come in many different sizes, shapes, and colors, but they do share a few features. Members of this family have large head scales, body scales that have bony plates underneath them, and a roof of the mouth that is made of two, flat bony plates instead of one, as humans and other animals have. The bony plate is called a palate (PAL-iht).

The skinks are divided into four major groups or subfamilies. The seventeen species in two of the subfamilies are legless, while the hundreds of species in the other two subfamilies have legs. A few species, known as comb-eared skinks, have noticeable scales that stick out near the ear opening on the side of the head.

Skinks, most of which have smooth scales, may be either small or large. The smallest adults grow to just 0.9 inches (2.3 centimeters) long from the tip of the head to the vent, which is a slit-like opening on the belly side of the lizard. If the lizard has legs, the vent is located between them. The longest skink is 20 times larger than the smallest, reaching 19.3 inches (49 centimeters) from the snout to the vent.

Color varies among the skinks, but many have rather drab, brownish bodies. The males of numerous species, however, often develop colorful heads during the breeding season. In many species, juveniles have bright blue, red, or yellow tails, which are believed to help them escape attacks by predators (PREH-dih-ters), or animals that hunt them for food. The predator snaps at the colored tail, which the young skink drops before running away. Adults are also able to lose their tails and survive.

phylum

class

subclass

order

monotypic order

suborder

▲ **family**

GEOGRAPHIC RANGE

They live on land almost around the world, except for many islands in the ocean and very cold places, such as Antarctica and high up in mountains.

HABITAT

Many skinks live mostly underground, hidden beneath logs, rocks, or among piles of leaves and twigs. Many of those that live underground dig their own burrows. The night skink builds a large tunnel system, which is marked by a large pile of sand near the most-used entrance. This lizard often has to share its tunnels with other animals that drop in day and night to sleep or to escape the weather or a predator. Some other species of skinks are good climbers and spend time on tree branches and tree trunks. While most of them live on land, some do not mind taking a dip in the water. Several species, like Gray's water skink and the eastern water skink, spend part of their time in ponds or streams.

DIET

Most species enjoy insects. Some are rather picky eaters and prefer to eat one kind of insect. Some of the underground-living, legless skinks, for example, eat mostly termites. A few species of skinks, including bobtails and sandfish, mix some flowers and grains into their insect diets, and others, such as the prehensile-tailed skink, are strictly vegetarian.

BEHAVIOR AND REPRODUCTION

Many of the skinks are active during the day, spending much of their days looking for food and sunbathing, or basking. Some species, such as the well-named night skink, only come out in the darkness. Most skinks are nervous animals that take cover if they feel even slightly threatened. For this reason, people often have only short glimpses of them before the lizards dart into a pile of brush or under a log. If an attacker is able to catch a skink before it can take cover, many of the species drop the tail, which continues to wiggle for several minutes. This draws the attention of the attacker and allows the lizard to escape. When the coast is clear, some skinks will return to whatever is left of the tail and eat it themselves. The tail grows back, but it is typically not as long as the original tail. The bobtail is unusual among skinks in that it does not immediately flee when

a predator arrives. Instead, this slow-moving lizard stands its ground, opens wide its mouth, and flaps its bright blue tongue.

Skinks do not pant as other lizards do, and scientists think that their extra palate is the reason why. Other lizards pant to cool off. The air they draw in and breathe out when panting cools off the blood in blood vessels along the roof of the mouth. The extra palate in skinks, however, may cover up the blood vessels so much that the air cannot get close enough to cool the blood, making panting useless. Instead, these lizards beat the heat by resting in a shady spot or cool underground burrow.

During mating season, males of many species will fight, biting one another on the head, neck, and tail until one gives up and leaves. In some species, male-female pairs remain together from year to year. Females of some species lay eggs, but other females give birth to baby skinks. Strangely, two species of skinks from Australia—Bougainville's skink and the three-toed skink—do both. Among skinks, the number of young varies from species to species, with some females having only one or two eggs or young at a time, and others having up to sixty-seven. Although most females make their own individual nests, mothers in a few species lay their eggs together in one big nest. Whether they nest together or alone, parents of many species provide some care to their eggs and young.

SKINKS AND PEOPLE

Some people keep the larger species as pets, but this family's biggest contribution to people comes when they are left in the wild. Skinks eat many insects, including those considered to be pest species.

CONSERVATION STATUS

According to the World Conservation Union (IUCN), three species are Extinct, which means they are no longer in existence. Twenty-six others are listed as Critically Endangered, Endangered, or Vulnerable, which means they face an extremely high,



IN THE BLINK OF AN EYE

When a person blinks, the upper lid slides down over the eye. When a lizard blinks its eye, only the lower eyelid moves. Skinks have a number of different lower eyelids, including some see-through types. These look rather like contact lenses that slide up and cover the eye. In some skinks, their lower eyelids always stay shut. These eyelids have a clear area or are completely clear, so the skinks can see even though their eyes are always closed.

very high, or high risk of extinction in the wild. Five are Near Threatened and are likely to qualify for a threatened category in the near future; and seven are Data Deficient, which means scientists need more information before they can make a judgment about the threat of extinction. The U.S. Fish and Wildlife Service lists three skinks as Threatened or likely to become endangered in the foreseeable future: the Round Island, bluetail mole, and sand skinks.



PREHENSILE-TAILED SKINK *Corucia zebrata*

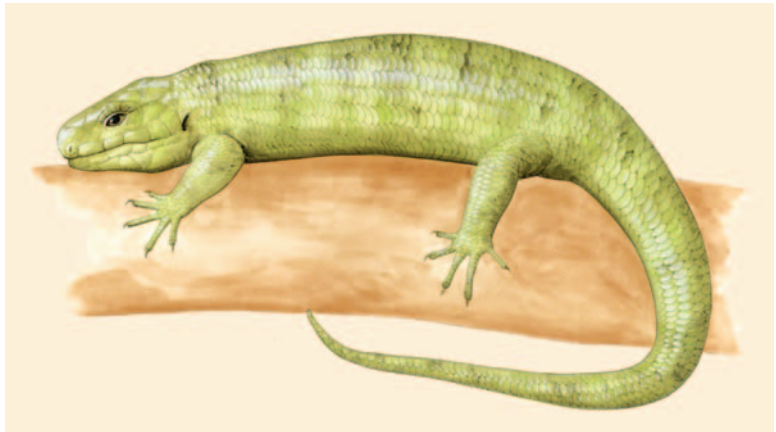
SPECIES ACCOUNTS

Physical characteristics: Large in size, the prehensile-tailed skink can grow to 30 inches (76 centimeters) in length from head to tail. A prehensile (pri-HEN-sihl) tail is one adapted for grasping like a monkey's tail. It has a muscular tail, a large head, and clawed legs on a thick grayish to brownish green body. Its underside is lighter green. The males usually are a bit thinner than the females and have a slightly bigger head.

Geographic range: They live east of New Guinea on the Solomon Islands.

Habitat: Prehensile-tailed skinks spend much of their days hidden among the leaves high up in trees, especially the strangler fig tree, or

Unlike the vast majority of other skinks, the prehensile-tailed skink is a strict vegetarian and particularly likes leaves and flowers it finds in the trees. (Illustration by Barbara Duperron. Reproduced by permission.)



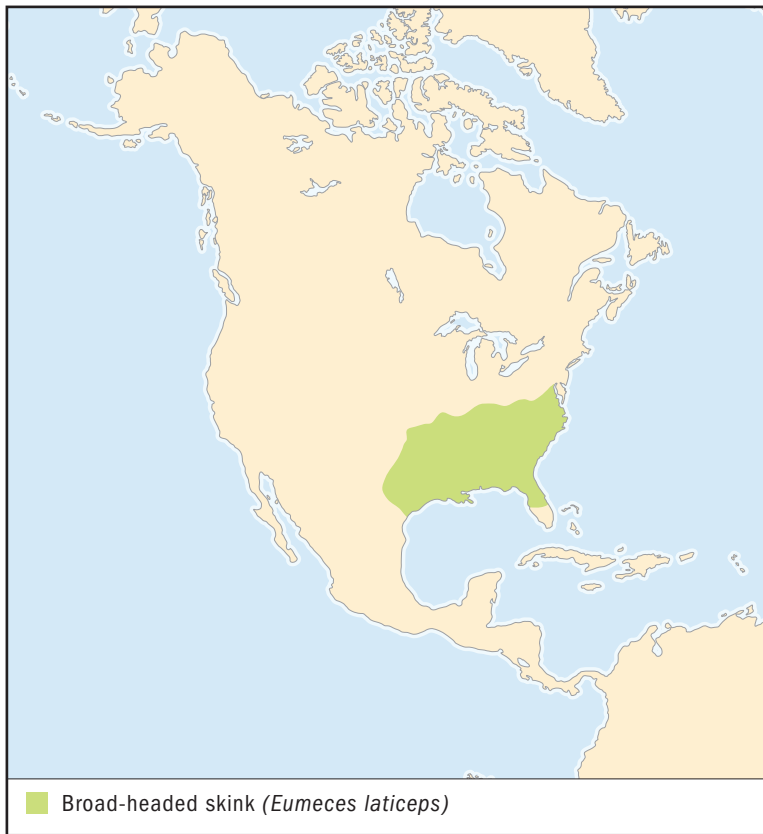
in holes in tree trunks or branches. They become active at night when they look for food.

Diet: Unlike the vast majority of other skinks, this species is a strict vegetarian and particularly likes leaves and flowers it finds in the trees.

Behavior and reproduction: Active at night, this skink usually spends its time slowly and calmly climbing on tree branches. When it feels threatened, it will hiss and even bite if necessary. Females usually give birth to just one baby at a time.

Prehensile-tailed skinks and people: Native people eat this skink. Other people often see them in zoos or other lizard exhibits, and some keep them as pets.

Conservation status: Although the prehensile-tailed skink is not listed as endangered or threatened, it faces a serious threat from over-collection by the pet trade. ■



BROAD-HEADED SKINK

Eumeces laticeps

Physical characteristics: Also known as the greater five-lined skink, the broad-headed skink is a brown to brownish gray lizard with darker, although often faint, stripes running from its wide head to the tail. The head of males turns reddish during the mating season. Adults grow to 9.8 inches (25 centimeters) in length.

Geographic range: Broad-headed skinks live mainly in the southeastern quarter of the United States.

Habitat: An excellent climber, the broad-headed skink lives in a variety of areas, including swamps, forests, and even near people, in everything from farm buildings to trash-filled city lots.

Female broad-headed skinks lay six to ten eggs at a time under leaves or in some other hiding spot and stay with them until they hatch. (©Larry L. Miller/Photo Researchers, Inc. Reproduced by permission.)

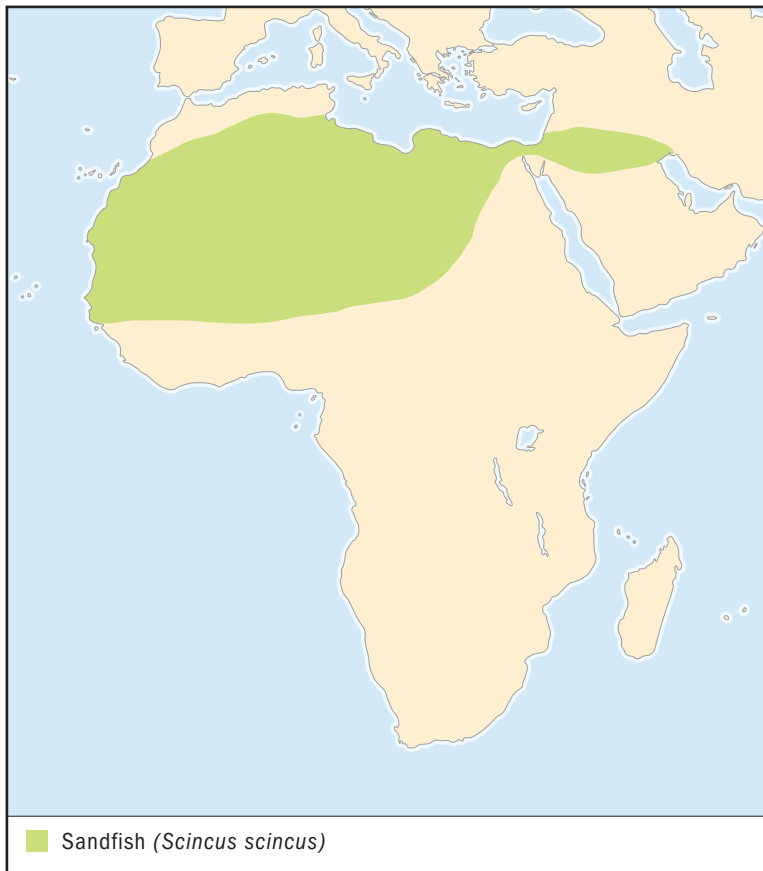


Diet: They spend much of their time looking for insects and other invertebrates (in-VER-teh-brehts), which are animals without backbones, to eat.

Behavior and reproduction: When broad-headed skinks feel threatened, which is quite often for these shy lizards, they quickly dart away. During the breeding season, males jump at and bite each other on the head, neck, or tail. Before long, one of the two fighting lizards will surrender and leave, and the other is left to mate with a female. Females lay six to ten eggs at a time under leaves or in some other hiding spot and stay with them until they hatch.

Broad-headed skinks and people: Most people see these lizards from a distance as they climb along fences or walk along tree branches. They are very shy and run when approached, so people rarely get a close look.

Conservation status: This species is not considered endangered or threatened. ■



SANDFISH

Scincus scincus

Physical characteristics: Sandfish are light brown lizards with slightly darker brown bands down the back. They have a pointed snout and thin legs ending in fringed toes that help them run on shifting sands. Adult sandfish usually reach about 8 inches (20.3 centimeters) in length, including the short tail.

Geographic range: Sandfish can be found in northern Africa, Iraq, Iran, Israel, and Jordan.

Habitat: Although they live in deserts, sandfish tend to live near a moister area, such as an oasis, which has loose sand and many plants.

When it feels threatened, the sandfish dives headfirst into the sandy ground and swims below the surface of the sand. (Illustration by Barbara Duperron. Reproduced by permission.)



Diet: Sandfish eat insects, scorpions, and other invertebrates, and an occasional small lizard. They move their arms and legs in a motion that allows them to “swim” through and just below the surface of the sand. From this position, they snatch unsuspecting insects walking on the ground above them. They also eat flowers and grains.

Behavior and reproduction: Active during the day, this lizard is best known for the way it escapes attackers. When it feels threatened, the sandfish dives headfirst into the sandy ground and swims below the surface of the sand. After a June breeding season, female sandfish lay about six eggs.

Sandfish and people: Native people hunt sandfish for their meat. At one time, people believed that dead dried sandfish could cure various diseases.

Conservation status: This species is not considered endangered or threatened. ■

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**ALLIGATOR LIZARDS,
GALLIWASPS, AND
RELATIVES**
Anguidae

Class: Reptilia

Order: Squamata

Suborder: Sauria

Family: Anguidae

Number of species: 112 species

family

CHAPTER

phylum

class

subclass

order

monotypic order

suborder

▲ **family**

PHYSICAL CHARACTERISTICS

This family contains four groups of lizards: the glass lizards and slowworms, the legless lizards, the galliwasp, and the alligator lizards. Many of these species in the Anguidae family have bodies that are nearly all brown, but some are green, and others have stripes or bands. The glass lizards have especially shiny scales. In a few species, the males are more brightly colored than the females. Among alligator lizards that live in mountainous areas, for example, the females and the juveniles are a drab brown, and the males are bright green or yellowish green. Some, such as the La Selle galliwasp, are small and reach only about 2.8 inches (7 centimeters) in length from head to tail tip. The slowworm, on the other hand, can grow to nearly 20 times that size at 55.1 inches (140 centimeters) long.

In general, the scales of these species are thick and strong, giving them an armor-like covering. Many of the legless lizards and galliwasp have a fold on each side of the body, which allows their bodies to stretch out when they eat a particularly big meal or when a female is pregnant. Some of the species, including the legless lizards, have no limbs and therefore slither about with a twisting motion. A few, such as the Moroccan glass lizard, have no front legs but do have tiny hind legs that look like small flaps located near the vent, which is a slitlike opening on the underside of the animal. The tail in galliwasp, legless lizards, and alligator lizards is usually shorter than the rest of the body, but the tail is far longer than the body in glass lizards. In all lizards, including those without legs, the tail begins at the vent. A few

species, such as the Cuban alligator lizard, live in trees and have tails that can wrap around and cling to branches and twigs. In addition, many members of this family have eyelids that they noticeably blink open and shut.

GEOGRAPHIC RANGE

These lizards live in North, Central, and South America, Europe, and Asia. They also make their homes on many islands of the West Indies. One species, the Moroccan glass lizard, lives in northern Africa.

HABITAT

Most of these lizards live on land and on the ground's surface, but they often remain in leaf piles, under stones, or in some other hiding spot. A few make their homes underground, and some spend much of their time in trees. While many species live in moist, low-lying areas, some live high in mountain forests or in dry and shrubby deserts.

DIET

These lizards will eat a number of different animals. They typically move very slowly, so their diet includes other slow-traveling things, such as snails, slugs, spiders, some insects, and other invertebrates (in-VER-teh-brehts), which are animals without backbones. When they eat vertebrates (VER-teh-brehts), which are animals with backbones, they tend to dine on bird eggs, baby rodents that are still in the nest, or other small animals, such as salamanders, that are not fast enough to get away.

BEHAVIOR AND REPRODUCTION

Depending on the species, they may be active during the day or at night. They usually stay out of sight, but many species will come out into the open on a sunny day to soak up the warmth. Such sunbathing is called basking. Often, these shy lizards will only expose one part of their bodies at a time while basking, keeping the rest hidden away. Those species that live in colder areas may spend the winter in a deep sleep, known as hibernation (high-bur-NAY-shun).

These lizards are especially known for their behavior when they feel threatened: Most members of this family quickly drop the tail, which may break into several wriggling pieces. While the attacker is looking at or eating the tail, the lizard makes its escape.



LIZARD OR SNAKE?

Several species of lizards, including the glass lizards of the family Anguidae, have no legs. Many people confuse these lizards with snakes. In fact, another common name for the eastern glass lizard is actually glass snake. At least two features, however, can give away this lizard's true identity. Unlike snakes, the eastern glass lizard has eyelids that it can blink shut and has ear openings that look like a hole on each side of the head. Snakes cannot blink shut their eyes and have no visible ear openings. The glass lizards get their name from their tails, which easily break off as if they were made of glass.

The lizard grows back the tail, but it is often much shorter than the original one. The glass lizard's regrown tail, for example, is a pointed stump. Some lizards in this family will also defend themselves by wiggling frantically, by smearing a bad-smelling ooze and/or feces on the attacker, or by puffing up the body with air, which may make the lizard appear large enough to scare off an attacker.

Within this family, some species lay eggs and others give birth to baby lizards. Female legless lizards all have one or two live babies in each litter. Depending on the species, female glass lizards and slowworms, galliwasp, and alligator lizards may lay eggs or give birth to baby lizards, with brood sizes from less than five to two dozen or more. In some egg-laying species, the female stays with the eggs, often wrapping her body around them, until they hatch. Most species have young every year, but some, such as the montane alligator lizard, probably only give birth once every two years. During breeding season, males of some species, including the

slowworm, will fight by grasping at one another with their jaws. For most species, however, scientists know little about their courtship behaviors.

ALLIGATOR LIZARDS, GALLIWASPS, THEIR RELATIVES, AND PEOPLE

Because many species like to hide, people rarely see them in the wild unless a person is plowing a field or raking leaves in their habitat. Some people mistake the glass lizard's stubby and pointed regrown tail for a stinger, but all lizards in this family are harmless. Several species are fairly common in the pet trade.

CONSERVATION STATUS

According to the World Conservation Union (IUCN), one species is Extinct, which means that it is no longer in existence. This species, the Jamaica giant galliwasp, was last seen in 1840. It probably disappeared because people brought new species, including the mongoose, to Jamaica to kill rats. The mongoose,

however, also eats galliwasps and probably played a role in their extinction. In addition, the IUCN names three species as Critically Endangered, which means they face an extremely high risk of extinction in the wild; one species as Endangered, which means it faces a very high risk of extinction in the wild, and one species as Vulnerable, which means it faces a high risk of extinction in the wild. These and other unlisted species are threatened by habitat destruction, particularly in such small places as the islands of the West Indies. The IUCN also lists three species as Data Deficient, which means that scientists have too little information to make a judgment about the threat of extinction.

SPECIES ACCOUNT



TEXAS ALLIGATOR LIZARD *Gerrhonotus liocephalus*

Physical characteristics: The Texas alligator lizard has a long tail and, unlike some other members of this family, four working legs. Its squarish scales somewhat resemble those of an alligator. Its back is reddish brown, sometimes yellowish, with crooked crossbands of white and black scales. Adults usually range from 9.8 to 15.7 inches (25 to 40 centimeters) in length, but some can be as long as 19.7 inches (50 centimeters).

Geographic range: They live from Texas in the United States to San Luis Potosí in central Mexico.

Habitat: The Texas alligator lizard often lives on rocky hillsides, preferring areas without many plants, although it does sometimes live in dry woods and shrubby areas.



When the Texas alligator lizard feels threatened, it can fill itself up with air, which may make it appear large enough that a predator will leave it alone. (Robert J. Huffman/Field Mark Publications. Reproduced by permission.)

Diet: This slow-moving species spends much of the day searching for various invertebrates, as well as small rodents or other vertebrates, it can capture and eat.

Behavior and reproduction: This species is active during the day. When it feels threatened, it can blow itself up with air, which may make it appear large enough that a predator will leave it alone. Females lay five to thirty-one eggs at least once a year, and they often remain with the eggs until they hatch.

Texas alligator lizards and people: People sometimes collect these lizards for pets.

Conservation status: The Texas alligator lizard is not listed as endangered or threatened. ■

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family

CHAPTER

KNOB-SCALED LIZARDS

Xenosauridae

Class: Reptilia

Order: Squamata

Suborder: Lacertilia

Family: Xenosauridae

Number of species: 6 species

PHYSICAL CHARACTERISTICS

With their flat heads and bodies and lumpy scales, the knob-scaled lizards have an unusual look. The head is usually triangular in shape, coming to a point at the tip of the snout. Some have a very noticeable ridge above the eye and extending forward to the snout and backward to the rear of the head. Often, the females have larger bodies than the males, but the males typically have bigger heads. Their bodies are usually dark brown to black, often with lighter-colored bands or blotches. The largest specimens grow to 4.7 to 5.1 inches (12 to 13 centimeters) long from the tip of the snout to the vent, a slitlike opening on the belly side of the animal at the beginning of the tail. The tail stretches nearly as long as the body.

Until 1999, this family only had four species. Discoveries of two new species—one in 2000 and one in 2002—increased the number to six. The two new species are known only by their scientific names: *Xenosaurus penai* and *Xenosaurus phalaroantheron*. Scientists believe additional species are yet to be identified. In particular, they suspect that a closer look at some of the already known knob-scaled lizards may reveal that they should actually be separated into two or more similar-looking species. This type of splitting is especially common in animals that live in small groups that are separated from one another, so the individuals from one group, or population, never see individuals from another population.

GEOGRAPHIC RANGE

Knob-scaled lizards live in typically small populations widely scattered from the Tamaulipas in northeastern Mexico on the

phylum

class

subclass

order

monotypic order

suborder

▲ family

Gulf of Mexico south to the middle of Guatemala in Central America.

HABITAT

Most knob-scaled lizards live in the mountains. Some species make their homes in cool cloud forests, while others prefer drier climates and live in hot, shrubby areas. In both cases, the knob-scaled lizards take advantage of their flattened shape and seek out cracks and holes in rocks and bark and other hiding places, where they spend much of their lives.

At one time, scientists included the Chinese crocodile lizard in this family. This lizard is now in its own family. Unlike the knob-scaled lizards, the Chinese crocodile lizard lives most of its life in or near shallow forest ponds, where it eats tadpoles and fishes.

DIET

These lizards are ambush hunters, which means that they sit very still and wait for their meal to come to them. Their meals are usually made up of insects that happen to come too close to their hiding places, which are usually in rock crevices. The lizards quickly grab the insects and gulp them down. Like other lizards, these species flick their tongues to pick up chemical odors from their insect prey. They cannot smell with their tongues, but they can smell with a special organ, called a Jacobson's organ, that sits above a small opening on the roof of the mouth. The lizard picks up the chemicals with its tongue and places them on the opening. A study of tongue-flicking behavior in *Xenosaurus platyceps* found that the young ones flicked their tongues to smell prey whether the lizards were in their hiding places or not, while the adult lizards did most of their tongue-flicking only when they were in holes or cracks. In other words, the adults were much more interested in finding prey when they were out of sight than when they were in the open.

At least one species of knob-scaled lizards, the Newman's knob-scaled lizard, will also eat bits of plants and some mammal meat. This suggests that the lizards may prefer insects but will eat just about anything they can find. Scientists call such animals opportunistic (ah-por-toon-ISS-tik), because they include almost any kind of plant or animal in their diet—if they are hungry and the opportunity presents itself.

BEHAVIOR AND REPRODUCTION

These lizards stay hidden away most of the time. Individuals in some species, including the one known simply as the knob-scaled lizard, live alone and defend their homes. Males will even bite one another on the head, which can leave behind noticeable scars. Other species, like Newman's knob-scaled lizard, are much more welcoming. In this species, pairs of male and female lizards often live together in peace in the same crevices. Members of this family usually stay in the same area throughout their lives, which can be quite long. Newman's knob-scaled lizards, for example, can live to be at least seven years old.

Females in all species give birth to baby lizards, rather than laying eggs as many other lizards do. A typical clutch for a lizard from this family is one to three babies, but some of those in the knob-scaled lizard species can have six young at a time. Once the females have their babies, usually from June to August, some stay with their young. Scientists have found that mothers in Newman's knob-scaled lizard species and the species known as *Xenosaurus platyceps* remain with their babies in their hidden-away homes, often keeping the young farther inside the hole or crevice, while the mothers stay nearer the entrance as if guarding the babies from possible land predators.

Some reports indicate that the lizards are most active at dawn and dusk and during the night. Because populations are scattered, their numbers are low, and they usually stay out of sight, much about their behavior and reproduction is still unknown.

KNOB-SCALED LIZARDS AND PEOPLE

At least one population of Newman's knob-scaled lizard lives in the cracks of a rock wall on a plantation, but for the most part the lizards in this family and people hardly ever see one another. Since the lizards seem to make their homes in very small areas and travel very little from those areas, however, farming or other human activity that might destroy their habitat



REALLY RELATED?

Many scientists once included the Chinese crocodile lizard as one of the species in the family of knob-scaled lizards. The Chinese crocodile lizard is very similar in appearance to the other knob-scaled lizards, which all live in Mexico and Central America. A 1999 study, however, compared their DNA and found that the Chinese crocodile lizard is different enough to have its own family, which is now called Shinisauridae. DNA is genetic material, essentially, an instruction booklet for making a living thing, that is passed down from parents to babies. By looking at differences in these "instructions," scientists can tell how closely two species are related.

could mean disaster for the lizards, which would likely be unable to find a new home nearby.

CONSERVATION STATUS

Although scientists still know little about these species or their overall population sizes, they are not considered endangered or threatened.



Knob-scaled lizard *Xenosaurus grandis*

SPECIES ACCOUNT

Physical characteristics: With a flat head and body and tall, bumpy scales, the knob-scaled lizard looks much like the other lizards in this family. This species, however, has bright red eyes and usually a dark-brown body, often with tan to cream bands or blotches. It grows to about 10 inches (25 centimeters) long from the tip of its snout to the end of its tail. The tail is a bit shorter than the rest of the body. Males and females are about the same size.

Geographic range: The knob-scaled lizard lives in both Central America and Mexico, stretching from Guatemala in the south to Veracruz, Mexico, on the Gulf of Mexico in the north.

Habitat: This species lives in wooded areas containing numerous cracks and crevices in rocks and bark where they can remain out of sight.



The knob-tailed lizard has bright red eyes and a usually dark-brown body, often with tan to cream bands or blotches. (Illustration by Brian Cressman. Reproduced by permission.)

Diet: Like other species in this family, the knob-scaled lizard mainly eats insects, which it captures by ambush.

Behavior and reproduction: These lizards typically live alone in their crevices, which they defend against other members of their species. Male-to-male fights sometimes break out, with the males biting at one another's head. Females give birth to one to six baby lizards at a time.

Knob-scaled lizards and people: Knob-scaled lizards and people rarely see or bother one another.

Conservation status: Although much about this species is unknown, it is not considered endangered or threatened. ■

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family CHAPTER

GILA MONSTER AND MEXICAN BEADED LIZARD

Helodermatidae

Class: Reptilia

Order: Squamata

Suborder: Scleroglossa

Family: Helodermatidae

Number of species: 2 species

PHYSICAL CHARACTERISTICS

The two species in this family, the Gila monster and the Mexican beaded lizard, are both large, heavy-bodied lizards coated with small, rounded bumps that look like the beadwork on clothing. The bumps, which are actually pebblelike scales, cover the tops of the arms, legs, head, and tail, as well as the back and sides of the body. These lizards have rather short, but strong arms and legs and long, thin claws. The tail may be thin or thick, depending on how well-fed the individual is. This is because these lizards store fat in their tails. Beaded lizards have slightly longer tails than the Gila monsters. An average beaded tail is at least two-thirds the length of the entire body, but the typical Gila tail is about half the total body length. Unlike many other lizards, these two species also have thick, forked tongues. Members of the same species can look very different from one another. Some adults are brightly patterned, while others are faded and dull. The patterns may be made up of spots, blotches, circles, bands, or squiggles on a background of pink, orange, yellow, dark gray, or black. Juveniles are usually banded.

Gila monsters and Mexican beaded lizards are the only two venomous (VEH-nuh-mus) lizards in the world. Unlike venomous snakes that deliver venom from the upper jaw and through grooves in just the two fangs, these lizards store their venom in the lower jaw and deliver it through grooves in numerous teeth.

Adult Gila monsters and beaded lizards range from 12 to 18 inches (30 to 45 centimeters) from the snout to the vent, which

phylum

class

subclass

order

monotypic order

suborder

▲ **family**



LIVING FOSSILS

The Gila monster and Mexican beaded lizard are often called “living fossils.” This means that they have changed very little from the way their ancestors looked millions of years ago. Both lizards belong to a family that scientists have traced back 98 million years, long before the great dinosaur extinction of 65 million years ago. Most species in this family have disappeared, but the Gila monster and Mexican beaded lizard remain and display many of the characteristics of their long-gone relatives.

is a difficult-to-see opening on the underside of the lizard at the beginning of the tail, or 14 to 39 inches (35 to 100 centimeters) from the snout to the tip of the tail. They weigh 1.0 to 4.4 pounds (450 grams to 2 kilograms). The beaded lizard can grow larger than the Gila monster.

GEOGRAPHIC RANGE

They live in North and Central America from the southwestern United States to northwestern Mexico, in Guatemala, and also in the state of Chiapas in southern Mexico.

HABITAT

Gila monsters and beaded lizards stay in deserts usually, although some make their homes in dry grassland, in shrubby forests on hillsides, or in nearby areas that have boulders or burrows where they can hide.

DIET

Gila monsters and beaded lizards wander through their habitat looking for young rabbits or rodents or snakes and lizard eggs to eat. They will even climb trees and cacti in search of bird eggs.

BEHAVIOR AND REPRODUCTION

These species spend about twenty-three hours of every day out of sight in burrows, within cracks in rocks, or in trees. When they do travel above ground, they wander about during the day looking for food or for mating partners, sometimes traveling more than 0.6 miles (1 kilometer). They also may come out in the evening. During the breeding season, the males of both species will fight one another, sometimes battling for two or three hours at a time. The male beaded lizards will arch their bodies and wrestle belly-to-belly until one comes out on top. The male Gila monsters wrestle by twisting the body to and fro. Courtship and mating occur in spring for the Gila monsters and in fall for the beaded lizards. Two to three months later, female Gila monsters lay two to twelve eggs, and female beaded lizards lay two to twenty-two eggs. Hatchling Gila monsters leave the nest the following spring in April, and hatchling beaded lizards appear in June or July as the wet season begins.

GILA MONSTERS, MEXICAN BEADED LIZARDS, AND PEOPLE

Although they are venomous, bites to humans are rare and typically only occur when a person tries to pick up one of these normally slow-moving Gila monsters or Mexican beaded lizards. Both can twist around quickly and deliver a hard bite. Their powerful jaws can remain clamped shut on a finger or hand for many minutes. While a bite can cause awful pain, swelling, and sometimes vomiting and sweating, it is hardly ever fatal. In fact, the last death due to a Gila monster bite occurred in 1930. On the positive side, scientists have found that substances in the venom may be useful in treating human diseases, such as diabetes.

CONSERVATION STATUS

The World Conservation Union (IUCN) considers both species in this family as Vulnerable, which means that they face a high risk of extinction in the wild. The destruction of their habitat, particularly as it is developed for housing or other human uses, is one of the biggest reasons they are at risk. Another reason for their low numbers is that humans sometimes illegally collect them for the pet trade or for personal pets.

SPECIES ACCOUNT



GILA MONSTER *Heloderma suspectum*

Physical characteristics: The Gila monster is a slow-moving, heavy-bodied lizard with rather short, clawed arms and legs and upper skin that looks beaded. The beads are actually rounded scales that appear on the top of the head, back, tail, and limbs and down the sides of the body. The color of the skin and scales differs from individual to individual, but most have at least some pattern, which can be quite bright and beautiful, of squiggles, spots, blotches, circles, and bands. Colors range from pink, orange, and yellow to black and dark gray. Well-fed Gila monsters have thick tails, which store fat. This species and the Mexican beaded lizard are the only two venomous lizards in the world. Adult Gila monsters commonly grow to about 20 inches (50 centimeters) in length from head to tail tip.

Geographic range: The Gila monster makes its home in the southwestern United States and in Sonora, Mexico.



Gila monsters need to eat only three large meals a year to survive. (Joe McDonald/Bruce Coleman, Inc. Reproduced by permission.)

Habitat: Gila monsters live in warm habitats, including deserts, grasslands, and shrubby forests, sometimes on flat ground and sometimes on hillsides. They spend most of their time in underground burrows, inside large cracks in rocks, or in other hiding places, only coming above ground for about one hour a day.

Diet: Gila monsters need to eat only three large meals a year to survive. They store fat in the tail and then use it up between meals, which can be several months apart. Their favorite foods include lizard, snake, and bird eggs, as well as young cottontail rabbits and rodents.

Behavior and reproduction: They remain in burrows or other hiding places for all but about one hour a day when they venture out to look for food or mates. If they feel threatened, they will hiss and sometimes snap at or bite the attacker. Once they bite, they have a very strong grip and may hold it for five minutes or longer. Males and females court and mate from late April to early June, and in July and August the females lay eggs in a damp sand nest. Babies are about 6.5 inches long from snout to tail tip when they hatch.

Gila monsters and people: A Gila monster bite can be painful, but it is almost never fatal to humans. The last reported death from a bite occurred in 1930. Bites rarely happen, however, and usually result from a person's carelessness in picking up the lizard.

Conservation status: The World Conservation Union (IUCN) considers the species to be Vulnerable, which means that it faces a high

risk of extinction in the wild. Habitat loss and illegal collection are the main problems the lizards face. ■

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family CHAPTER

MONITORS, GOANNAS, AND EARLESS MONITOR

Varanidae

Class: Reptilia

Order: Squamata

Suborder: Varanoidei

Family: Varanidae

Number of species: About 61
species

PHYSICAL CHARACTERISTICS

The monitors, goannas, and earless monitor all have a similar overall appearance, although some are rather small and others are very large. The smallest species is the Australian pygmy monitor that only reaches about 6.7 to 7.9 inches (17 to 20 centimeters) in length from snout to tail tip and weighs just 0.28 to 0.71 ounces (8 to 20 grams). The family contains the largest lizards in the world. The heaviest is the Indonesian Komodo dragon. This immense animal can grow to be at least 9.9 feet (3 meters) long and 330 pounds (150 kilograms). Many people consider the crocodile monitor to be the world's longest lizard. They may grow to 12 feet (nearly 3.7 meters) long from snout to tail tip, or as some reports claim, the lizards can reach a whopping 15 to 19 feet (4.6 to 5.8 meters) in length.

The monitors, goannas, and earless monitor have heavy bodies and long necks. Their tongues are long and forked, and they have noticeable, sometimes large, eyes. Many have somewhat saggy skin that hangs in small folds on their sides and necks. Most of the members of this family have teeth with edges like saw blades, which help them tear through the skin and flesh of their prey.

GEOGRAPHIC RANGE

Australia is home to about one-half of the known species. Members of this family also live in Africa; central to southern mainland Asia; Southeast Asia, especially the Malaysian and Indonesian islands; and Papua, New Guinea.

phylum

class

subclass

order

monotypic order

suborder

▲ **family**

HABITAT

These lizards live in many different habitats from dry deserts and grasslands, to lush forests and swamps. Some rarely if ever leave the land, and others rarely leave the water. Several species climb trees. This includes the green tree monitor of New Guinea and Australia, which has a very strong tail that it uses when climbing.

DIET

Most members of this family are meat-eaters. The smaller species typically dine on insects, centipedes, worms, and other invertebrates (pronounced in-VER-teh-brehts), which are animals without backbones. Medium-sized species eat lizards, lizard and turtle eggs, and young mammals and birds, while the very large monitors will capture, kill, and eat deer, monkeys, adult birds, wild pigs, buffalo, and other big animals. Monitors also eat carrion (KARE-ree-un), which is the flesh of an already-dead animal. They are not picky eaters, and many will even eat young of their own species. A few species eat fruit.

Members of this family spend a good part of the day looking for food, with some traveling 0.6 mile (1 kilometer) or more between sunup and sunset. They flick their tongues to pick up the scent of a prey animal and then rely on their eyesight and their ears to help hunt down the animal when they get close. Some species, including the sand monitor, swing their heads back and forth while flicking their tongues so they can pick up scents from a wider area and then track animals, especially small lizards, to their underground burrows. They use their long claws to dig up the lizards. Other species, such as the Komodo dragon, sometimes hunt by ambush, which means that they sit very still so they are not obvious and wait for a prey animal to wander by. The Komodo dragon then rushes from its hiding spot and grabs the animal.

BEHAVIOR AND REPRODUCTION

These lizards are active during the day. Those that live on land spend their nights in the hollow of a tree, a burrow that they dig, or some other hiding place. Many of them enter the water at times and are good swimmers. A few, such as the Nile monitor and Merten's water monitor, only come out of the water to sunbathe, or bask, on shore. The females also leave the water to dig holes along the shoreline, where they lay their eggs.

Many species in this family hide themselves when they hear people coming, so people often see little but their footprints. When they cannot hide, these lizards will defend themselves. They will typically flatten out from side to side and puff out their cheeks, which makes them look larger. A few even stand up on their hind legs. They also hiss. Some of the larger species can be quite dangerous, because they can swing their tail around with great speed and use it as a whip to strike the attacker. The Komodo dragon is large enough to kill humans with bites from its powerful jaws.

During the breeding season, males will fight over females. Their fights are wrestling matches in which two males stand belly to belly, grip each other with their arms, and try to knock one another down. Smaller species wrestle while lying on the ground. The winning male then courts the female by flicking his tongue over her snout and body. After mating, the females lay eggs in underground burrows, occasionally dug in the middle of termite nests or ground-built bird nests. Depending on the species, she may lay two to sixty eggs. The smallest species lay the fewest eggs, and the largest lay the most.

MONITORS, GOANNAS, EARLESS MONITOR, AND PEOPLE

These lizards are usually shy animals that hide when people approach. For this reason, people usually do not see them. The footprints they leave behind, however, usually provide enough clues to tell which species recently passed by. Monitor lizards are often mentioned in ancient tales and are likely the basis for legends of dragons. Some humans now hunt them for their skin, which is highly prized as leather.

CONSERVATION STATUS

According to the World Conservation Union (IUCN), two species are Vulnerable, which means they face a high risk of extinction in the wild. These are the Indonesian Komodo dragon and the Philippine Gray's monitor. Their low numbers



GIANT LIZARDS

The Komodo dragon is the heaviest lizard on Earth today, but it is only half as long and weighs just one-quarter of the amount of its ancient relative, known as *Megalania prisca*. This enormous lizard tipped the scales at more than 1,320 pounds (600 kilograms), compared to the Komodo's 330 pounds (150 kilograms). While a Komodo can grow to an impressive 10 feet long (3 meters), *Megalania prisca* grew to at least 20 feet (6.1 meters) from snout to tail tip. Some people believe it may have even reached 30 feet (9.1 meters) or more. Now extinct, the lizard lived until at least 19,000 years ago.

are due mainly to habitat loss and to hunting. People kill these lizards for their skin. The U.S. Fish and Wildlife Service lists the following four species as Endangered, which means that they are in danger of extinction throughout all or a significant portion of their range: the desert monitor, the Indian monitor, the Komodo dragon, and the yellow monitor.



KOMODO DRAGON

Varanus komodoensis

SPECIES ACCOUNTS

Physical characteristics: A thick-bodied animal, the Komodo dragon is the world's heaviest lizard. It can reach a weight of 330 pounds (150 kilograms) and a length up to 9.9 feet (3 meters) from snout to tail tip.

Geographic range: They live on a few Indonesian islands, including Komodo.

Habitat: Komodo dragons can live in dry or moist habitats and are good enough swimmers to spend some time in the water.

Diet: They are meat eaters, dining on deer, pigs, other mammals, lizards, and birds. The juvenile diet includes insects, bird and turtle eggs, and carrion.

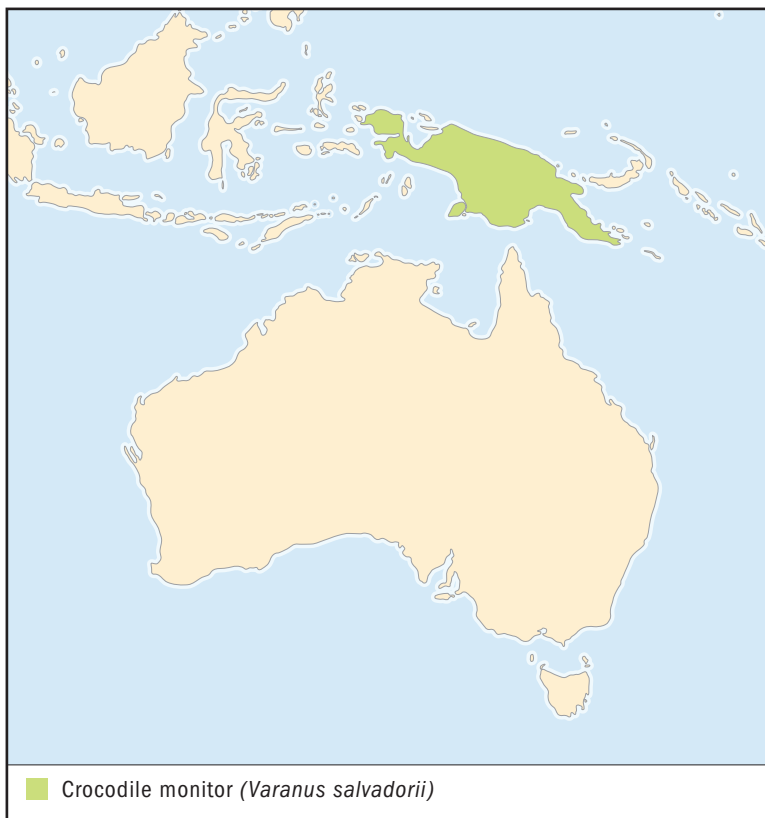


The Komodo dragon is the world's heaviest lizard. It can reach a weight of 330 pounds (150 kilograms) (Erwin & Peggy Bauer/Bruce Coleman Inc. Reproduced by permission.)

Behavior and reproduction: Komodo dragons are active during the day, when they do their hunting. They either walk around looking for food or hunt by ambush. Juveniles are good climbers, but adults are too large to climb and stay on the ground. The mating season runs from May to August. In September, the females begin laying their eggs in burrows. The average nest contains about eighteen eggs, but some females can lay as many as three dozen at a time. The young hatch in March and April. When they reach eight or nine years old, they are ready to mate and become parents themselves.

Komodo dragons and people: Most people know of Komodo dragons from the zoo. Humans may find use for these lizards, because their blood contains special substances, called antibodies (AN-tee-BA-dees), that may someday help fight health problems in people.

Conservation status: Because the number of Komodo dragons is small, and they live in a very small area where their habitat is disappearing, the World Conservation Union (IUCN) considers these lizards to be Vulnerable, which means that they face a high risk of extinction in the wild. The U.S. Fish and Wildlife Service considers the lizards to be Endangered, which means that they are in danger of extinction throughout all or a significant portion of their range. ■



CROCODILE MONITOR

Varanus salvadorii

Physical characteristics: The crocodile monitor is a long-tailed, yellow-spotted lizard that may grow to 12 feet (nearly 3.7 meters) in length from snout to tail tip, although some claim that the lizards may reach 15 to 19 feet (4.6 to 5.8 meters) long. It is often considered to be the world's longest lizard.

Geographic range: This lizard lives on southern New Guinea.

Habitat: The crocodile monitor frequently climbs into trees of the rainforest.

Diet: They probably eat birds in the wild, but in captivity, they also eat mice and rats.

The crocodile monitor is reported to be the world's longest lizard. They can grow to a length of 12 feet (nearly 3.7 meters). (©Tom McHugh/Photo Researchers, Inc. Reproduced by permission.)



Behavior and reproduction: Crocodile monitors spend much of their time in trees where they look for food. When they feel threatened, they will swing their tails like whips to strike an attacker. During mating season, the males wrestle one another. Females lay eggs, which hatch into large babies that can be 20 inches (0.5 meter) in length.

Crocodile monitors and people: Legends among the native people of New Guinea claim that this lizard is an evil spirit that breathes fire and eats men.

Conservation status: The crocodile monitor is not considered endangered or threatened. ■

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EARLY BLIND SNAKES

Anomalepididae

Class: Reptilia

Order: Squamata

Suborder: Serpentes

Family: Anomalepididae

Number of species: 16 species

family

CHAPTER

phylum

class

subclass

order

monotypic order

suborder

▲ family

PHYSICAL CHARACTERISTICS

Early blind snakes are small, thin snakes, with many species reaching just 6 to 10 inches (15 to 25 centimeters) in length and less than one-tenth of an ounce (2.8 grams) in weight when full-grown. Five of the sixteen species are a bit larger and can top 12 inches (31 centimeters) in length, with some reaching as much as 16 inches (41 centimeters). The larger species include the greater blind snake and the four lesser blind snakes known by their scientific names. Most members of this family Anomalepididae have no common names and are known only by their scientific names. The typical early blind snake has a dark brown or black body with white, yellow, or pink on the head and tail. A few species lack the lighter color on the head and tail and are all reddish brown to brown.

The snakes in this family all have short heads with rounded snouts, and most have slightly larger scales on the snout than on the rest of the body. Compared to other snakes, their tongues are quite short. They have stumpy tails that make up just 1 to 3.4 percent of the snake's total body length. In snakes, the tail begins at the vent, a slitlike opening on the belly side of the animal. The tail in half of the early blind snake species is tipped with a thin, sharp spine. The other species have tails without spines.

They look much like slender blind snakes of the family Lepotyphlopidae and blind snakes of the family Typhlopidae. The snakes in all three families have tube-shaped bodies that are covered in smooth, round scales. Unlike most snakes that have belly scales, or ventrals, that are noticeably larger than the scales

on the sides and back, the members of these three families have belly scales that are about the same size as the others. The three families also share a few other traits. All have small mouths that open not on the front end of the head as in most other snakes, but slightly before the front end and on the bottom. They have tiny eyes that are barely noticeable, if they are noticeable at all, beneath scales on the head.

Early blind snakes do have some differences from the other two blind snake families. Early blind snakes have teeth on both the upper and lower jaws, while snakes in the other families have them only on the upper jaw or only on the lower jaw. In addition, early blind snakes have more scale rows than the others. Scientists determine scale rows by counting the number of scales from the belly up the side over the top and down the other side. Most early blind snakes have more than 20 scale rows.

Early blind snakes sometimes go by the common names of primitive or dawn blind snakes. Because many individuals have a head and tail that are very hard to tell apart, they are also sometimes called two-headed snakes.

GEOGRAPHIC RANGE

Early blind snakes live in southern Central America, across northern South America and possibly on Trinidad, and then down the eastern side of South America to northeastern Argentina. Of the four main groups, or genera (jen-AIR-uh), in this family, two live from Costa Rica to northern South America. These include the four species in the genus (JEAN-us) (the singular of genera) *Anomalepis* and the three species in the genus *Helminthophis*. The two species of the genus *Typhlophis* live only in South America, from central Venezuela eastward through French Guiana and southward through northeastern Brazil. One species may extend onto Trinidad. The largest genus is *Liotyphlops* with eight species. Some of these live from Costa Rica into northern South America, and others make their homes



TANGLED FAMILIES

Although some sources lump the blind snakes together in one family, most scientists place them in three separate families: the blind snakes of the family Typhlopidae, the early blind snakes of the family Anomalepididae, and the slender blind snakes of the family Leptotyphlopidae. The early blind snakes first got their own family in 1939 when Edward H. Taylor noticed several differences in them from other blind snakes, including a greater number of scale rows and the presence of teeth on both jaws instead of just one or the other. They also have an unusually shaped bone, called the hyoid (HIGH-oid), that supports the tongue. In early blind snakes, it is M-shaped, rather than the typical V- or Y-shape seen in other snakes.

farther south in southern Brazil, southeastern Paraguay, and northeastern Argentina.

One species, *Helminthophis flavotermatus*, lives on the Indian Ocean island of Mauritius, far away from the other early blind snakes. Humans are likely responsible for bringing the snake to the island.

HABITAT

These snakes live most of their lives below the ground; one individual was reported buried 1.6 feet (0.5 meters) deep in the soil. They also spend time beneath rocks, logs, and piles of leaves. Like other underground-living, or fossorial (faw-SOR-ee-ul), species that stay out of human sight and live in remote areas, scientists know little about them. People have reported these snakes in a number of different habitats from dry forests to rainforests, and from low-lying grasslands to nearly 6,000 feet (1,830 meters) up rocky mountainsides. Although no one has seen early blind snakes doing it, scientists suspect that they can and do climb trees.

DIET

At least two species eat ant eggs, as well as ant larvae (LAR-vee) and pupae (PEW-pee), which are the life stages between the egg and the adult ant. Scientists suspect that other early blind snakes also eat ants and possibly other insects, but they have not studied them in enough detail to say for sure.

BEHAVIOR AND REPRODUCTION

Scientists know little about their behavior in the wild but suspect that they remain active all year and mainly at night. In captivity, the snakes stay underground most of the time. When picked up by a person, an early blind snake defends itself by squirming and twisting its body and then releasing body waste—both of which may cause the person to lose grip or let go of the snake. If it has a spine-tipped tail, the snake will also jab it into the person's hand.

Snake researchers guess that the early blind snakes probably lay eggs rather than give birth to live babies, but they have not studied them enough to be sure. No information is available on when or how the snakes mate or on how many young they have.

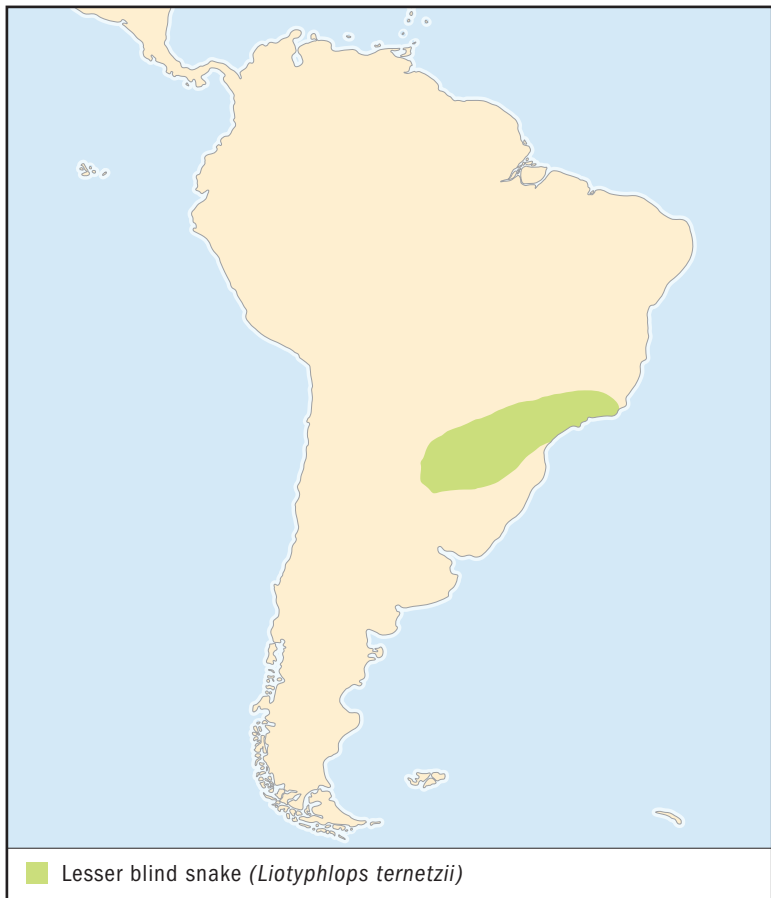
EARLY BLIND SNAKES AND PEOPLE

Early blind snakes and people rarely encounter one another.

CONSERVATION STATUS

These species are not listed as endangered or threatened. Like many other species that live much of their lives underground, however, scientists have little information about their numbers in the wild. In fact, scientists know about six of the sixteen species only from a few individuals caught in the area where the first ones were found, and they have not seen one species, the South American blind snake (*Anomalepis aspinosus*), since 1916.

SPECIES ACCOUNT



LESSER BLIND SNAKE *Liotyphlops ternetzii*

Physical characteristics: One of the larger members of the family, lesser blind snake adults can grow to more than 12 inches (31 centimeters) in length. It is a thin, black, wormlike snake with white on its head. Its shiny body is covered with small scales that are all about the same size. It has tiny eyes and a small mouth that opens on the bottom of the head rather than in front like the mouths in most other snakes. Its body is tube-shaped and ends with a short spine-tipped tail. Its skeleton includes bits of hip bones that are leftover reminders of its ancient ancestors, which had legs.

Geographic range: The lesser blind snake lives in Central and South America.

Habitat: This species spends most of its time underground, beneath rocks or logs, or in other hiding places.

Diet: They eat ant eggs, larvae, and pupae. The larvae and pupae are the life stages between the egg and the adult ant. They may also eat other insects.

Behavior and reproduction: Scientists know almost nothing about their behavior and reproduction. They suspect, however, that these snakes are active at night throughout the year and that they lay eggs.

Lesser blind snakes and people: Lesser blind snakes and people rarely encounter one another.

Conservation status: The species is not listed as endangered or threatened, but scientists have little information about their numbers in the wild. ■

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One of the larger members of the family, lesser blind snake adults can grow to more than 12 inches (31 centimeters) in length. (Illustration by Emily Damstra. Reproduced by permission.)

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family

CHAPTER

SLENDER BLIND SNAKES, THREAD SNAKES, OR WORM SNAKES

Leptotyphlopidae

Class: Reptilia

Order: Squamata

Suborder: Serpentes

Family: Leptotyphlopidae

Number of species: 93 species

PHYSICAL CHARACTERISTICS

Slender blind snakes, which are also known as thread snakes or worm snakes, are thin snakes with smooth, shiny scales. Members of this family look much like blind snakes of the family Typhlopidae and the early blind snakes of the family Anomalepididae, since all have tube-shaped bodies that are about the same diameter from head to tail, and all have short heads with mouths that open downward instead of right on the front end of the head. Species within the three blind snake families have small eyes and bodies that are covered with small scales that are the same size on the belly as they are on the sides and back. In most snakes, the belly scales, or ventrals, are noticeably larger. In the three blind snake families, only the scales on the snout are larger.

The slender blind snakes are different from the other two families in several ways. While all are slim, the slender blind snakes are the thinnest. The bodies of most species within this family are no wider than 0.2 inches (0.5 centimeters), and some are as little as 1/25th of an inch (1 millimeter) wide. This gives them the appearance of moving string or thread. The largest species in the family, such as the western slender blind snake (also known as the southwestern thread snake) and the western thread snake, may reach more than 15 inches (38 centimeters) in length, but most of the 93 species in the family are much smaller. The typical adult ranges from 4 to 10 inches (10 to 25 centimeters) in length and no more than 0.05 ounces (1.4 grams) in weight. Another characteristic that sets the slender blind snakes apart from the other blind snakes—and indeed

phylum

class

subclass

order

monotypic order

suborder

▲ **family**

from all other snakes—is their teeth. Slender blind snakes are the only snakes that have teeth on the lower jaw, but none on the upper jaw.

Most slender blind snakes have backs that are all one color. They may be pink, light or dark brown, black, or gray. A few South American species are colorfully striped. The tails vary in length from about 2 percent of the overall body length to 19 percent, but most have tails that take up about 5 to 10 percent of the total length. The tail on a snake begins at the vent, which is a slitlike opening on the underside and toward the rear of the animal. The tail in almost all species of slender blind snakes has a sharp spine on the end. Most have rounded snouts, but some have hooked and/or pointed snouts. In one unusual species, known as the western slender blind snake, the largest of its snout scales glows under ultraviolet light. Inside the body, the skeleton of most slender blind snakes includes pieces of hip and upper leg bones that are leftover reminders of its ancient ancestors, which had working hips and legs. In boas and other snakes that have similar structures, the bony bits sometimes stick out of the body near the vent and look like small claws. These “claws” are called spurs. In slender blind snakes, the leftover bones usually do not poke through the skin. A few species have another odd feature in their skeletons: The top of the skull is missing.

GEOGRAPHIC RANGE

Slender blind snakes live in South, Central, and North America, as well as Africa and southwest Asia. North American species live in Mexico and the southwestern United States. Certain species also live on the island of Socotra in the northwestern Indian Ocean, in the West Indies, and on islands off the coast of Africa, Mexico, and Central America.

HABITAT

Slender blind snakes can live in many different habitats from dry deserts and humid rainforests to rocky mountainsides, but within those habitats, they always seek at least slightly damp areas. These burrowing snakes spend much of their day buried under an inch or two (2.5 to 5 centimeters) of soil, hidden beneath stones or logs, or out of view in piles of rotting leaves or inside ant and termite hills. The species known only by its scientific name of *Leptotyphlops natatrix* may be a swimmer. Just one individual from this species has ever been found, and it was discovered in 1931 in a swamp in Gambia.

DIET

Slender blind snakes eat small invertebrates (in-VER-teh-brehts), which are insects and other animals without backbones. Many of the species will eat almost anything, including insects such as caterpillars, fly maggots, beetles, cockroaches, and crickets, as well as spiders, harvestmen, which include daddy longlegs, and the many-legged centipedes and millipedes. Most species, however, tend to prefer ants and termites. The snakes are able to find ant and termite hills by following the chemical trails that these insects leave on the ground as they travel to and from the nest. Once the snake tracks down the ant or termite hill, it slithers inside and eats as much as it can. In ant hills, they especially like the eggs, larvae (LAR-vee), and pupae (PYU-pee). Ant eggs hatch into larvae, which are the maggotlike life stage of ants. Eventually, the larvae transform into the motionless pupae stage before becoming adult ants. The slender blind snakes are able to jut out and pull in the lower jaw very quickly, which allows them to eat hundreds of eggs, larvae, and pupae in a very short time.

Many animals avoid ant hills because these insects, which are very protective of their nests, can bite and sting. The slender blind snake, however, is able to defend itself. When attacked, the snake rolls into a ball and smears itself with its body's own ant repellant: a mixture of slime and feces. The ants shy away from the smelly mess, leaving the snake to return to its meal.

BEHAVIOR AND REPRODUCTION

Slender blind snakes spend most of their time out of sight and below ground, sometimes as much as 49 feet (15 meters) down, but they will crawl out of their burrows at night or after a heavy rain. They are able to dig through loose, sandy soil but cannot dig into harder ground, so they probably use other



SIZE MATTERS

Some animals need to live in a moist environment. The slender blind snakes, for example, burrow underground, hide beneath rocks, or slither into rotting logs or piles of dead leaves. One of the reasons a slender blind snake needs moisture is its very high surface-to-volume ratio. This is a mathematical formula that shows how much outer surface, or surface area, an animal has compared to the space, or volume, the entire animal takes up. Because the slender blind snake is so long and thin, it has a great deal of surface area compared to its overall tiny body. If the snake were round like a ball rather than long and thin, its surface area would be much, much smaller. The outside weather has a greater effect on animals with higher surface-to-volume ratios, because a higher percentage of their total body volume is exposed. This means that they can dry out especially fast and may even die. For this reason, these animals frequently live in moist habitats or underground where their surroundings are damp.

animals' burrows or perhaps crawl along the paths of plant and tree roots when they are in tougher soil conditions. If they feel threatened, the snakes will squirm wildly, and those with tail spines will jab their attacker. Some species may also stiffen up their bodies and play dead in an attempt to survive an attack.

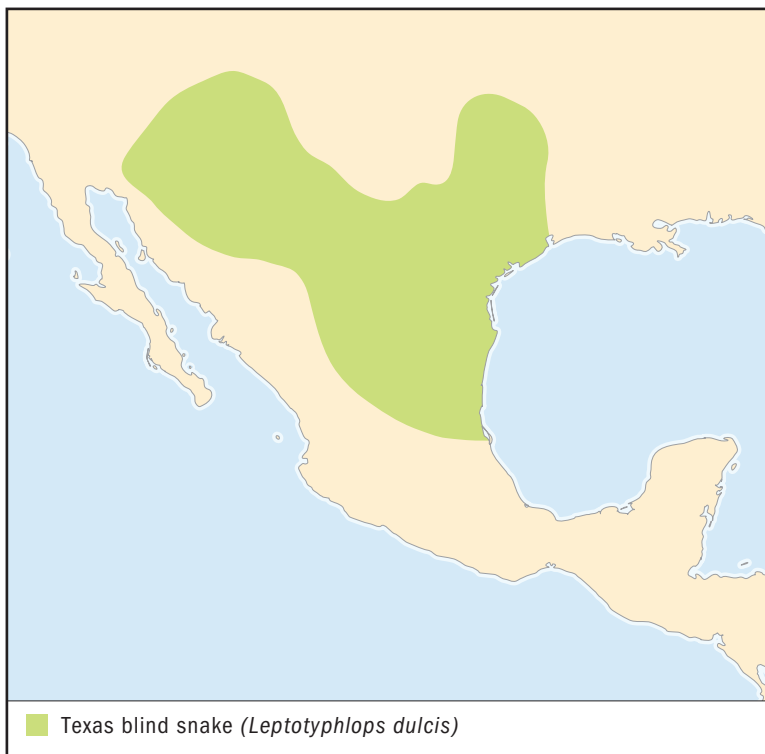
Although they are not sure, scientists suspect that all species lay eggs, rather than give birth to live baby snakes. The few snakes that have been studied mate in the spring and lay one to twelve eggs at a time in the summer.

SLENDER BLIND SNAKES AND PEOPLE

These snakes and humans rarely encounter one another.

CONSERVATION STATUS

These snakes are not listed as endangered or threatened.



TEXAS BLIND SNAKE *Leptotyphlops dulcis*

SPECIES ACCOUNT

Physical characteristics: With their brownish pink to dark brown coloration, Texas blind snakes look much like earthworms, except that the snakes have noticeable scales and lack the worm's segments. The snakes have a lighter colored, sometimes almost white, underside. Also known as Texas thread snakes, they have a long, thin body and a small head with eyes that appear as little more than tiny dark spots. Adults range from 2.6 to 10.7 inches (6.6 to 27 centimeters) long. The tail is short, just 5 to 6 percent of total body length, and has a spine at the end.

Geographic range: Texas blind snakes are found in the southwestern United States and northeastern Mexico.



With their brownish pink to dark brown coloration, Texas blind snakes look much like earthworms, except that the snakes have noticeable scales and lack the worm's segments. (Illustration by Emily Damstra. Reproduced by permission.)

Habitat: Also known as a Texas worm snake, the Texas blind snake spends much of its time in the dirt, under rocks, or in some other hiding place. It can live in dry areas, including deserts and rocky mountainsides, but often chooses a spot near a water source.

Diet: Texas blind snakes most often eat ant larvae and pupae and termites, but they sometimes eat other insects and spiders. They always eat ant larvae and pupae whole, but they often refuse to eat the heads of termites and sometimes only chew the juices out of the back portion of the termite. Once in a while, a small owl known as a screech owl will swoop down to snatch a Texas blind snake and, keeping it

alive, bring it back to its nest. There, the snake cleans out the nest by eating small invertebrates that might otherwise nibble on the owl.

Behavior and reproduction: Texas blind snakes live mainly underground but sometimes crawl out of their burrows at night or after a rain downpour. They are not especially good at slithering above ground and sometimes jab the tail spine into the ground to push off. Males and females group together in the spring for the mating season. The female lays two to seven eggs in June or July and then coils around them. Often, several females lay their eggs near one another. The eggs hatch in late summer into baby snakes about 2.6 to 3 inches (6.6 to 7.6 centimeters) long.

Texas blind snakes and people: Texas blind snakes and people rarely encounter one another.

Conservation status: This species is not listed as endangered or threatened. ■

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BLIND SNAKES

Typhlopidae

Class: Reptilia

Order: Squamata

Suborder: Serpentes

Family: Typhlopidae

Number of species: 214 species

family

CHAPTER

phylum

class

subclass

order

monotypic order

suborder

▲ family

PHYSICAL CHARACTERISTICS

Most blind snakes are small, with many species reaching less than 12 inches (31 centimeters) in length at full size. Adult flowerpot snakes, for example, reach only 4 to 6.5 inches (10 to 16.5 centimeters) long. A few species, however, can grow to more than 24 inches (61 centimeters). The largest, known as Peter's giant blind snake or the Zambezi blind snake, can top 3 feet (0.9 meters) in length and weigh 1.1 pounds (0.5 kilograms).

The typical blind snake is smooth and shiny with a tube-shaped body. Usually, the head, body, and tail have about the same diameter, although in a few of the larger species, the back half of the animal may grow fat and become quite thick. The scales on their backs are thick and noticeably overlap one another. In some other families of snakes, the scales barely overlap, if they overlap at all. Such an arrangement of overlapping, thick scales gives the blind snakes a strong protective cover.

Blind snakes have short heads, typically with small eyes covered by a see-through scale and a small mouth that opens on the underside of the snake rather than on the front of the head like most other snakes. In some species, the snout is rounded, but in others it may flatten out toward the front, become pointed or hooked, or have some other shape. A few species have little bits of flesh that stick out of the front of the snout and are used by the snake to feel its way along the dark, underground tunnels in which it lives. The tails are usually rather short and often tipped with a single, thorny spine. The spine is especially noticeable in *Typhlops depressiceps* and *Acutotyphlops subocularis*. The tail in a

snake begins at the vent, a slitlike opening on the snake's underside. They range from tails that make up less than 1/100th of the body length to tails in some species that consist of 1/10th of the overall body.

Many blind snakes have brown, dark gray, or black backs, and a few have bright patterns, such as speckles, blotches, or stripes of white, yellow, orange, or blue. The bellies are often a lighter color than the backs. A few of the blind snakes, including the *Xenotyphlops grandidieri*, are completely uncolored and look a rather sickly white.

GEOGRAPHIC RANGE

Blind snakes are found in tropical areas nearly around the world, including New Guinea and Australia, Southeast Asia, Africa and Madagascar, the Middle East, southeastern Europe, Mexico, Central America, and northern South America. They are also found on many islands in the Pacific and Indian oceans and in the West Indies. One species, commonly called the flow-erpot blind snake or Brahminy blind snake, has traveled throughout the world, including the United States, in plant shipments. Many people mistake this species for an earthworm, but the snake is shiny, has a light-colored underside, and lacks the rings around its body that worms have.

HABITAT

Blind snakes are burrowing species that spend most of their lives either underground or out of sight under logs, tree bark, stones, or in some other hiding place. Some will even slither into ant or termite hills. Rainy weather seems to persuade many blind snakes to leave their underground homes and crawl out onto land. A few species have been found in trees, but they may not actually live there and instead be just visiting to look for a meal. Some blind snakes live in wet rainforests, but other species survive quite well in deserts. Many others live in grasslands, dry forests, farm fields, sandy beaches at the oceanside, or high up mountainsides. Almost half of the species are found only on islands, and about 85 percent of all species of blind snakes live only in the Old World, which includes Asia, Europe, and Africa in the Eastern Hemisphere.

DIET

Blind snakes eat termites, ants, worms, and other small invertebrates (in-VER-teh-brehts). Invertebrates are animals



NOT THE WHOLE SKIN

Snakes do not shed all of their skin. Instead, they shed only the outermost layer, called the stratum corneum (STRAT-um kor-NEE-um). When a snake sheds, or molts, the stratum corneum comes loose, and the snake slips out of it so that it peels off and leaves a complete, inside-out shed that is thin and nearly see-through. In the blind snake of the family Typhlopidae, which has an exceptionally thick stratum corneum, the shed comes off not in an entire piece but in bits and pieces that look like a number of rubbery rings.

without backbones. Some of the insects attempt to bite or sting in defense, but the thick, overlapping scales on the blind snake protect it from harm. The snakes follow ant trails to their nests by flicking out their tongues, which they use to smell and taste the trail. They are very fast eaters, sometimes gobbling up to 100 insects in just a minute's time. They can eat so rapidly because their upper teeth can be pushed out and then pulled back into the mouth, somewhat like a fast-moving rake. When they find an anthill, for example, they can rake through it and pull in prey very quickly.

BEHAVIOR AND REPRODUCTION

As is true with many other burrowing species that remain out of sight most of the time, scientists know little about their behavior or reproduction. When they are dug out of their burrows, the snakes quickly try to bury themselves again. If they are captured, they will wiggle wildly, ooze a bad-smelling material from the vent area, release their body waste, and/or poke the tail spine into the attacker. Any of these actions can cause the attacker to drop the snake. Occasionally, up to twenty individuals from some species of blind snakes coil up together under a stone. Scientists are unsure why they do it, but they think the snakes are just sharing a good spot.

Most blind snakes lay eggs, but in a few species, the eggs may hatch inside the mother so that she gives birth to live baby snakes. The flowerpot snake may be parthenogenetic (PAR-tih-no-jeh-NEH-tik), which means that the females do not need males to fertilize their eggs in order to have babies. It is the only parthenogenetic snake, and one of the few parthenogenetic vertebrates in the entire animal kingdom. Vertebrates (VER-teh-brehts) are animals with backbones. Among blind snakes overall, small or especially thin species have fewer eggs — sometimes just one, raisin-sized egg. Larger species may have more than fifty eggs that are the size of large grapes. Eggs probably hatch in one to two months, but some hatch in just a week. Many of the blind snakes mate during only one season

a year, usually in late spring, but others appear to mate all year long.

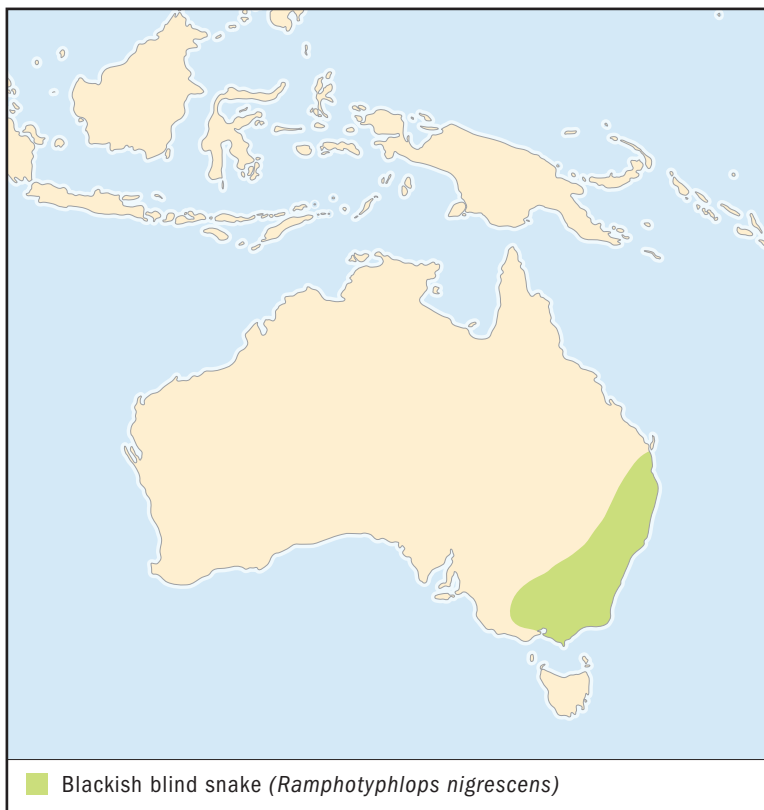
BLIND SNAKES AND PEOPLE

Many African and Asian cultures mention blind snakes in their legends and folklore.

CONSERVATION STATUS

The World Conservation Union (IUCN) lists the Mona Island blind snake as Endangered, which means it faces a very high risk of extinction in the wild. It also lists the Christmas Island blind snake as Vulnerable, which means it faces a high risk of extinction in the wild. Scientists know little about the wild populations of many species, however, so others may be at risk.

SPECIES ACCOUNT



BLACKISH BLIND SNAKE *Ramphotyphlops nigrescens*

Physical characteristics: The blackish blind snake, also known as the English blind snake, has a dark back and lighter belly. The back may be black, purple, or pinkish brown, while the underside is pink or off-white. The vent may have a dark blotch on either side. The snout is short and rounded. Size ranges from 3.8 to 22.7 inches (9.7 to 57.6 centimeters) long, and the females are much larger than the males.

Geographic range: Blackish blind snakes live in the eastern half of Australia.

Habitat: People usually see these snakes while turning over rocks or other items in gardens, farm fields, or even in city lots. The snakes also live in similar hiding spots in the woods and along the coastline.

Diet: Blackish blind snakes eat ant larvae (LAR-vee) and pupae (PYU-pee), which are the stages in an ant's life between egg and juvenile. They will also eat worms and other small invertebrates once in a while. A single blackish blind snake can eat 1,500 ants or more at one sitting. The snakes usually only feed in the spring and summer.

Behavior and reproduction: Blackish blind snakes are a burrowing species that spends much of its time underground. Up to thirty members of the species sometimes group together to share a good spot under a stone or in some other hiding spot. After a heavy rain, blackish blind snakes may leave their burrows and slither about on the ground, sometimes even climbing into trees. This species mates in late spring, and the females lay five to twenty grape-sized eggs at a time in the summer.

Blackish blind snakes and people: People and these snakes generally leave one another alone.

Conservation status: The species is not listed as endangered or threatened. ■

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A single blackish blind snake can eat 1,500 ants or more at one sitting. (Illustration by Bruce Worden. Reproduced by permission.)

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family CHAPTER

FALSE BLIND SNAKES

Anomochilidae

Class: Reptilia

Order: Squamata

Suborder: Serpentes

Family: Anomochilidae

Number of species: 2 species

PHYSICAL CHARACTERISTICS

False blind snakes are also known as dwarf pipe snakes because, at first glance, they look very much like small pipe snakes. Pipe snakes actually fall under a separate family, the Cylindrophiiidae. The false blind snake has a short head and a short tail on either end of a tube-shaped body. In snakes, the tail is the portion of the body that begins at the vent, a cross-wise opening on the belly side and toward the rear of a snake. On either side of the vent, these snakes have a tiny bit of bone that sticks out. These bones are called spurs and are seen in a few other snake families, including the boas.

Their backs are a dark reddish color blotched with yellowish white markings. The eyes and mouth in a false blind snake are small. In most snakes, the mouth opens at the very tip of the head, but in false blind snakes, it opens slightly before the end of the head. Both species in this family have seventeen to nineteen scale rows. In other words, if a person counted the number of scales in a straight line from the belly over the back the snake and back down to the belly, he or she would find seventeen to nineteen rows. The number of scales on the underside of the snake from front to back is between 222 and 252 in the false blind snake known as *Anomochilus leonardi* and between 236 and 248 in the snake *Anomochilus weberi*. The common name for both species is false blind snake. The short tail in both species only has six to eight scales on the underside.

Based on the specimens in museums, adult false blind snakes range from 8 to 14 inches (20 to 36 centimeters) in length.

phylum

class

subclass

order

monotypic order

suborder

▲ **family**



MYSTERIES BELOW

As humans build ships to travel to space or deep in the oceans, a wide variety of life forms go unnoticed beneath our feet. Many of the species that spend their lives out of view in underground tunnels or even just underneath piles of leaves are overlooked. The false blind snakes are a good example. Although they live over a large region in Indonesia, scientists have only found a few and have never studied a living specimen. The same holds true for many other underground species, which leaves wide open a huge area of study for future biologists.

Scientists have studied only museum specimens rather than living snakes in the wild.

GEOGRAPHIC RANGE

False blind snakes are found in Borneo, the Malaysian Peninsula, and Sumatra.

HABITAT

False blind snakes probably live in loose soil or under leaves, but this is uncertain. Only a few individuals have been found, and these have been spread out in such a way that some scientists now think that the two species are really just different populations of one species, while others believe that the snakes should be split into more than two species.

DIET

False blind snakes probably eat worms and insect larvae (LAR-vee), which may include grubs or caterpillars, but this is just a guess. No one has studied a live false blind snake.

In addition, no researcher has found a dead one and opened up its stomach to see what it had been eating.

BEHAVIOR AND REPRODUCTION

Scientists have never studied a live false blind snake, so they know nothing about its behavior. They did, however, find one female that had shelled eggs still inside her. From this, they guessed that the species lays eggs. Snakes, however, fall into three groups. One of them is oviparous (oh-VIH-puh-rus), which means that the female produces and lays shelled eggs. The babies in the eggs get all their necessary food from inside the egg until they hatch. The second group is viviparous (vie-VIH-puh-rus), which means that the mother makes no eggs, provides all of the food for the babies through connections inside of her body, and gives birth to baby snakes. No eggs are involved. The third group is ovoviviparous (oh-voh-vie-VIH-puh-rus), which falls somewhere between oviparous and viviparous. The females in ovoviviparous species produce eggs, but the eggs hatch inside her body just before she gives birth. The babies, then, get food from the egg rather than directly from the

mother, but are born as baby snakes. Only oviparous species are considered to be egg-layers. The other two groups are said to be live-bearing snakes, meaning that they give birth to baby snakes rather than eggs. Since scientists have only seen eggs in a dead female but have never seen one give birth, they cannot tell for sure whether this species is oviparous or ovoviviparous.

FALSE BLIND SNAKES AND PEOPLE

False blind snakes continue to live their lives outside the view of people.

CONSERVATION STATUS

The World Conservation Union (IUCN) considers the two false blind snakes to be Data Deficient, which means that scientists as yet have too little information to make a judgment about the threat of extinction.

SPECIES ACCOUNT



FALSE BLIND SNAKE *Anomochilus leonardi*

Physical characteristics: The false blind snake has a tube-shaped body, a short head with small eyes and mouth, and a short tail. At first glance, it is difficult to tell which end is the head and which is the tail. It has small, oblong, whitish spots down its dark red to brown back. Adults range from 8 to 14 inches (20 to 36 centimeters) in length. The size range may change a bit once scientists study more false blind snakes.

Geographic range: False blind snakes live in the Malaysian Peninsula and Borneo.

Habitat: They probably live in loose soil or under leaves, but this is uncertain.

Diet: They probably eat invertebrates, which are insects, worms, and other animals without backbones.

Behavior and reproduction: False blind snakes are probably egg-layers, although this is uncertain. Their behavior and reproduction are unknown.

False blind snakes and people: People see this snake only very rarely and generally leave it alone.

Conservation status: The World Conservation Union (IUCN) considers the false blind snake to be Data Deficient, which means that scientists as yet have too little information to make a judgment about the threat of extinction. ■



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False blind snakes are found in Borneo, the Malaysian Peninsula, and Sumatra. (Illustration by Emily Damstra. Reproduced by permission.)

SHIELDTAIL SNAKES

Uropeltidae

Class: Reptilia

Order: Squamata

Suborder: Serpentes

Family: Uropeltidae

Number of species: 47 species

family

CHAPTER

phylum

class

subclass

order

monotypic order

suborder

▲ family

PHYSICAL CHARACTERISTICS

Almost all of the forty-seven species of shieldtail snakes have a head that gets narrower and narrower until it comes to a point at the end. In some species, the head gets narrower from side to side, and in others it narrows from top to bottom. The pointed snout is covered with thick scales made of fingernail-like material, and in some snakes, a particularly large scale makes a roof over the top of the snout. Many species have a large scale at the very end of the tail. This large scale looks something like a shield, which is how the snakes got their common name of shieldtails. The large tail scale may have ridges, or keels, or it may be covered with spines. Often, the snake has other thick and keeled scales that form a flattened oval just in front of the shield scale. If the snakes live in wet areas, these keels and spines can pick up and hold mud, which may form into a large clump.

Many species are brown, gray, or black. Some have dark bands. A number of species have white or yellowish white outlines around their belly scales, which can make them look rather speckled. Some shieldtails have bright yellow bellies marked with dark spots, and blue, so-called iridescent (IH-rih-DEH-sent) backs that shimmer different colors when the light strikes them. A few species in Sri Lanka look like members of the cobra family. This type of copying, called mimicry (pronounced MIM-ick-ree), actually causes some birds that might otherwise attack the snakes to stay away.

Although it cannot be seen from the outside, shieldtail snakes are different from other snakes in the kind of muscle tissue that

they have in the trunk, or portion of the body between the head and the tail. In snakes, the tail begins at the vent, a slitlike opening on the underside of the snake. The muscles in the front part of the trunk in shieldtails have red muscle fibers in addition to the white muscle fibers present in other snakes. The red fibers can work longer than the white ones without tiring out, and scientists believe that these long-lasting fibers help the snake, which spends much of its time digging.

Shieldtail snakes are mostly small snakes, with most adults growing to less than 12 inches (30 centimeters) in length. Some grow longer, and a few such as the *Rhinophis oxyrhynchus* and *Uropeltis ocellatus* can reach nearly 24 inches (61 centimeters) in length.

GEOGRAPHIC RANGE

Shieldtail snakes live in southern India and in Sri Lanka or Ceylon, which is located off India's southern coast.

HABITAT

Shieldtail snakes make their homes in forests that may be in low areas or on the sides of mountains, usually preferring places with moist or wet ground. They also live in gardens and farm fields, including rubber plantations. Unlike most digging snakes that only push through loose soil, the shieldtails will also tunnel through quite hard, clay soils. In addition, they will scoot under leaves or logs.

DIET

Shieldtails mainly eat worms, but some species will also eat caterpillars and termites, and at least one species in captivity will eat earwigs. Earwigs are small insects with a pair of pincers on the end of the body. After studying how several species eat worms, scientists found that the snakes either grab the worm at the end or in the middle and quickly drag them back into the burrow. The bodies of those worms caught in the middle fold in half as they are dragged into the snake's narrow burrow.



BURROWING BY JERKS

Some scientists believe that the shieldtail snakes burrow through the ground with an odd jerking movement. According to this idea, the snakes twist up the backbone behind the head so that it is curved back and forth and then quickly push the backbone out straight to burst the head forward. In other words, the back acts like a spring that is squeezed together and then let loose. By repeating this movement and scooting up the body each time, the snake digs through the soil. This is the same type of jerking movement used by pipe snakes, but pipe snakes use it to force the head forward as a way of gulping down large prey.

BEHAVIOR AND REPRODUCTION

The shieldtails stay hidden underground most of the time, but many will come up to the surface after a good rain, and at least one species will then begin hunting for worms. If the snakes feel threatened, they will wiggle away while looking for some loose soil and then force the head into the ground to start tunneling. They are expert diggers and can tunnel quickly. If prodded with a stick or otherwise attacked, the snake will coil around the stick or other object and begin waving the tail end of the body. Apparently, predators are confused into thinking the tail is the head. The snake can survive an attack to the tail much better than an attack to the head, so the tail waving may save its life. It is also possible that some predators may be scared off by the tail-waving behavior.

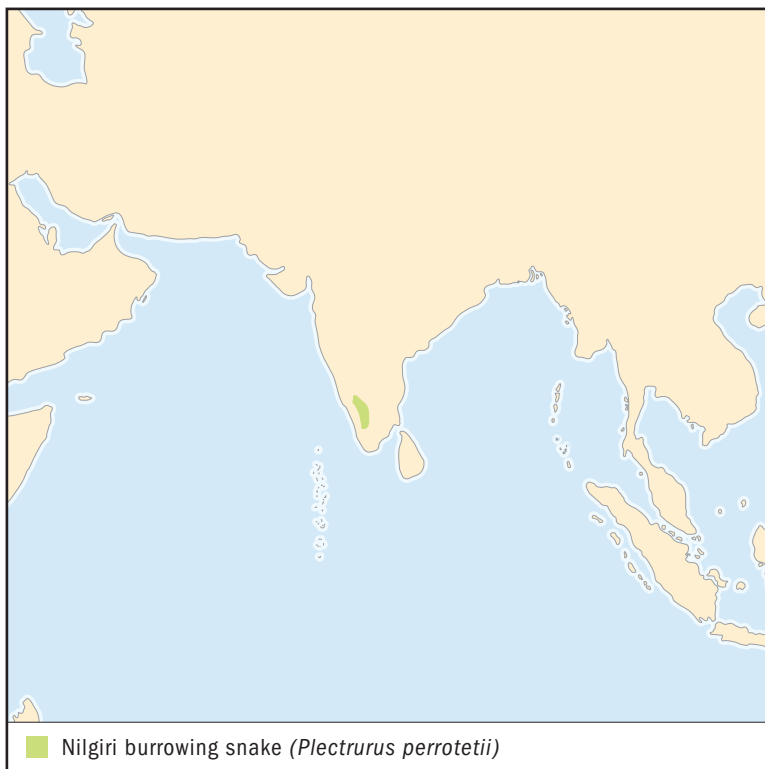
Female shieldtail snakes give birth to baby snakes rather than laying eggs. Typically, they have two to five young at a time, with larger females giving birth to a larger number than younger mothers. Births likely occur between March and September. Scientists know little else about their behavior or reproduction.

SHIELDTAIL SNAKES AND PEOPLE

These snakes and people rarely encounter each other.

CONSERVATION STATUS

These species are not listed as endangered or threatened, but scientists know little about the size of the snakes' populations.



NILGIRI BURROWING SNAKE

Plectrurus perrotetii

SPECIES ACCOUNT

Physical characteristics: One of the larger species in this family, the Nilgiri burrowing snake can reach 17.3 inches (44 centimeters) in length. They are tube-shaped snakes with purplish brown to brown backs and bellies that are often either a light brown or yellowish color. In some species, the bellies are spotted with a lighter color, and each of these spots is located right in the center of a belly scale. The head is flattened from top to bottom. The tail is tipped with a spiny, cup-shaped scale.

Geographic range: The snake lives in Nilgiri and the Anamalai Hills in southern India.

Habitat: Most of the snakes found by people are buried about 4 to 6 inches (10 to 15 centimeters) deep in the very rich soil of gardens



One of the larger species in this family, the Nilgiri burrowing snake can reach 17.3 inches (44 centimeters) in length. (Illustration by Bruce Worden. Reproduced by permission.)

or farm fields. The snakes especially like soil with lots of manure mixed into it. Farmers and gardeners often use manure, which contains many nutrients, to fertilize their soil and help their plants to grow. The snakes live high up on hillsides.

Diet: The Nilgiri burrowing snake eats mainly worms.

Behavior and reproduction: They spend much of their time in burrows, but if the weather turns cooler, they will move out of their homes and explore piles of manure that farmers and gardeners have left above the ground. They give birth to baby

snakes rather than laying eggs. Females have three to six babies at a time, usually in July or August. Scientists know little else about their behavior or reproduction.

Nilgiri burrowing snakes and people: These snakes and people rarely see or bother each other.

Conservation status: The Nilgiri burrowing snake is not listed as endangered or threatened, but scientists know little about the size of the snake's population. ■

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PIPE SNAKES

Cylindrophiiidae

Class: Reptilia

Order: Squamata

Suborder: Serpentes

Family: Cylindrophiiidae

Number of species: 9 species

family

CHAPTER

phylum

class

subclass

order

monotypic order

suborder

▲ family

PHYSICAL CHARACTERISTICS

The family name Cylindrophiiidae points out one of the pipe snakes' most noticeable features: their tube- or cylinder-shaped bodies. The family includes nine species, which are often called Asian pipe snakes to set them apart from other families of snakes that some people also call pipe snakes. These include the somewhat similar-looking false coral snakes of the family Aniliidae and the false blind snakes of the family Anomochilidae.

The pipe snakes are usually dark brown to black with yellow or reddish bands running from the belly up the sides of the back. The back bands are sometimes very pale and difficult to see. The underside of the tail, however, usually has a very bright red or yellow tip. Some pipe snakes have stripes, and others have light-colored spots that color the middle of the snake's back from head to tail. Counted from one side over the back and down the other side, they have seventeen to twenty-three rows of scales. The head, which is no wider than the neck, is rounded and contains two small eyes with round or slightly oblong pupils and two nostrils that each sit inside a single scale. Pipe snakes also have a very short, pointy tail that is about as thick as the rest of the body. The tail in a snake begins at the vent, a slitlike opening on the underside of the animal. Pipe snakes are small- to medium-sized snakes, ranging from 1 to 3 feet (0.4 to 1 meters) long.

GEOGRAPHIC RANGE

Pipe snakes live in Indonesia, including Borneo, Sumatra, and Aru Island west of New Guinea; Sri Lanka or Ceylon off

the coast of southern India; and southern China. They also exist in much of Southeast Asia, including Thailand, Laos, Cambodia, Myanmar, and Vietnam.

HABITAT

Pipe snakes tend to live in low-lying forests near a water source and in rice paddies, but they may also crawl into nearby villages and towns. They often slither under leaves or into soft, moist soil on the ground. They are also excellent swimmers.

DIET

The red-tailed pipe snake, and probably the other eight species, eats long and thin animals, including other snakes, eels, and lengthy lizards. For this reason, their jaws do not need to open as wide and their necks and bodies do not need to stretch as much as other snakes, which eat prey that are larger around. The pipe snakes are constrictors (kun-STRIK-tuhrs), which means that the snake will grasp its prey by looping its body around the animal and squeezing. For small prey, the snake may hold the animal just until it can reach its head around and eat it. For larger animals, the snake squeezes the prey until it cannot breathe and stops moving before eating it. People who keep pipe snakes in captivity find that the snakes will also eat small mice and fish.

Pipe snakes swallow in an unusual way. After swallowing part-way with some of the prey still hanging outside, the snake shuts its mouth, curves its backbone back and forth, and then reopens its mouth while quickly straightening out the backbone, which causes the head to shoot forward over more of the prey's body. Some people believe the snake may dig through the soil by the same method, but no one has seen this.

BEHAVIOR AND REPRODUCTION

Pipe snakes stay out of sight in the dirt or under leaves much of the time but will crawl about above ground after a heavy rain.



THE NAME GAME

Scientific names for animals, such as *Cylindrophis ruffus*, may appear to be long and confusing, but they actually make it much easier for researchers to tell animals apart. This is because all scientists around the world use the same scientific names no matter what language they speak. This is not true of common names. For example, among just the English-speaking people, some use the common name of pipe snake for the nine species in the family Cylindrophiidae, but others use it to mean the species in the family Aniliidae or those in the family Anomochilidae. A scientific name has two parts: the genus name, which notes the general group to which the animal belongs, and the species name, which reveals the exact type of animal. In addition, the genus name tells scientists which animals are the most closely related. All nine members of the Cylindrophiidae family, for instance, are of the same genus and are therefore closely related.

Their most noted behavior is a defense tactic that involves flattening out the body and then raising and curling over the tail to show off its bright red or yellow color. At the same time, they bury the head under part of the body and wave the now flattened tail. Although the pipe snake performs the display with its tail rather than its head, it looks much like the flattened neck and head-waving behavior seen in cobras. The display may be enough to convince an attacking animal, called a predator (PREH-duh-ter), from taking a bite out of the pipe snake. If the display does not work, however, and the predator so much as touches the snake, the pipe snake will ooze a bad-smelling mixture from its vent area. Captured snakes will continue to perform the cobra display and give off the bad-smelling material for a few weeks, but eventually they get used to their new surroundings and people and stop both behaviors.

Based on information collected by watching captive snakes, the pipe snakes are able to dig quite swiftly through unpacked soil and will make tunnels that are about twice as wide as their bodies. While the wide tunnels do give them room to turn around, these snakes are able to slither frontward and backward at about the same speed. Scientists know little else about their behavior.

Pipe snakes give birth to live babies rather than eggs, most mothers having two to five young at a time. Larger females may have closer to five young, and smaller females may have closer to two. The baby snakes are quite large, often measuring half the length of the mother's body.

PIPE SNAKES AND PEOPLE

Pipe snakes and humans have little contact.

CONSERVATION STATUS

These species are not listed as endangered or threatened. Like many other species that live much of their lives underground, however, scientists have little information about their numbers in the wild.



RED-TAILED PIPE SNAKE

Cylindrophis ruffus

SPECIES ACCOUNT

Physical characteristics: The small, nonvenomous (nahn-VEH-nuh-mus) red-tailed pipe snake is a black snake with reddish or white bands. The back is slightly iridescent (IH-rih-DEH-sent), which means that it reflects different colors depending on how light bounces off. In the bright sunshine, for example, the scales may shine blue, green, yellow, or red. The undersides have a black and white checkerboard pattern, except for the tail. The tail is banded with black, white, and sometimes red and has a red tip. Adults usually reach about 15.5 to 16 inches (39 to 41 centimeters) long but can grow to about twice that size.

Geographic range: Red-tailed pipe snakes are found in southern China and much of Indonesia and southeast Asia.



The red-tailed pipe snake is mostly known for its behavior when it feels threatened. The snake will flatten out its body and raise its tail, moving it much as a cobra would wave its flattened neck and head. (Illustration by Bruce Worden. Reproduced by permission.)

Habitat: Red-tailed pipe snakes spend most of their time under leaves or in burrows that they can dig themselves. They live in forests, often near a water source, and in rice paddies, but they may also live in nearby villages and towns.

Diet: It eats other snakes, lizards, and eels. A constrictor, it is able to squeeze the prey animals until they cannot breathe and either pass out or die before being eaten.

Behavior and reproduction: The red-tailed pipe snake is mostly known for its behavior when it feels threatened. The snake will flatten out its

body and raise its tail, moving it much as a cobra would wave its flattened neck and head. Although the tail can do no harm, the display is often enough to convince an attacking animal to leave the snake alone. This species gives birth to baby snakes rather than eggs. The females typically have two young at a time but occasionally have up to twelve. Young are about 7 inches (18 centimeters) long at birth.

Red-tailed pipe snakes and people: Humans and these snakes have little contact.

Conservation status: These species are not listed as endangered or threatened. Like many other species that live much of their lives underground, however, scientists have little information about their numbers in the wild. ■

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FALSE CORAL SNAKE

Aniliidae

Class: Reptilia

Order: Squamata

Suborder: Serpentes

Family: Aniliidae

One species: False coral snake
(*Anilius scytale*)

family

CHAPTER

phylum

class

subclass

order

monotypic order

suborder

▲ family

PHYSICAL CHARACTERISTICS

The false coral snake, the only species in this family, is a brightly colored, orange, red, or pinkish snake with fifty to sixty black bands. Each of the bands is two, three, or four scales wide. In some members of this species, the black bands are incomplete. In other words, they only reach partway up the sides of the snake and do not meet at the top of the back. Sometimes, the individual orange, red, or pinkish scales are outlined in black, making the snake look slightly speckled. Its belly is all red, orange, or pinkish, with no black banding. All scales on its body are shiny and smooth, which means they have no ridges, or keels. This nonvenomous (nahn-VEH-nuh-mus) snake looks somewhat similar to the venomous, or poisonous, coral snake species that shares its habitat and is therefore known as a “false” coral snake. Both false coral snakes and coral snakes, which are in the family Colubridae, are red, orange, or pink with evenly spaced black bands.

The body of a false coral snake is about the same thickness from one end to the other, giving the snake an overall tube shape. Both the head and tail are short. In snakes, the tail begins at the vent, which is a slitlike opening on the underside of the snake. This tube-shaped body is very similar to that of the pipe snakes of family Cyndrophiiidae, and the false coral snakes are sometimes called red pipe snakes. At one time, in fact, the two families were combined into just one family. The only slight change in the body thickness of the false coral snake is in its head, which flattens out a bit. The head, which is made

of very thick bones, has two small eyes covered by scales, and the large jaws have cone-shaped teeth that are very slightly curved. The snakes also have spurs, which are tiny, barely noticeable bits of bone that stick out near the vent. The snakes reach about 2 to 3 feet (0.6 to 1 meters) in length.

Within this species of false coral snake, scientists have named two subspecies, or races. A species has a two-part name, and the false coral snake is named *Anilius scytale*. When scientists name subspecies, they add a third name to the end of the scientific name. In the case of the false coral snakes, the two subspecies have slightly different scale patterns. *Anilius scytale scytale*, abbreviated to *A. s. scytale*, has more than 225 ventrals, which are the scales on its underside, and *A. s. phelpsorum* has fewer than 225. The belly scales in snakes are generally wider than the rest of the scales on the snake's sides and back. *A. s. scytale* also has black bands that are shorter than the red bands, while *A. s. phelpsorum* has black bands that are longer than the red bands. In addition, the two subspecies usually live in different areas, with *A. s. phelpsorum* living farther north than *A. s. scytale*. In some areas, such as northern Brazil and French Guiana, some individuals look a little bit like both subspecies, which means that their two parents may be from two different subspecies.

GEOGRAPHIC RANGE

False coral snakes live in eastern Peru, Ecuador, Colombia, Bolivia, Brazil, French Guiana, southwestern Venezuela, Suriname, and Guyana, especially in the Amazon and Orinoco Basins, which are the areas surrounding the Amazon and Orinoco Rivers of South America.

HABITAT

This snake spends much of its time in burrows in loose soil. It lives in rainforests, especially in low-lying areas near streams or other waterways.



BONY MEMORIES

Some snakes, including false coral snakes, have spurs. These are tiny bits of bone that barely jut out near the vent, which is the slitlike opening on the underside of a snake. The spur is actually part of leftover hip and sometimes upper leg bones, carried down through the years from the long-ago ancestors of snakes, which had working hips and legs. The legs gradually disappeared, and in most snakes, the hips vanished, too. In the false coral snakes, however, the spurs are a reminder of past life on Earth.

The false coral snake is a nonpoisonous snake and usually stays underground during the daytime. (Illustration by Jonathan Higgins. Reproduced by permission.)



DIET

False coral snakes eat long and narrow vertebrates (VER-teh-brehts), which are animals with backbones. These include small snakes, eels, caecilians, and amphisbaenians. Caecilians (seh-SEE-lee-ens) are salamanderlike animals that live underground. Amphisbaenians (am-fizz-BANE-ee-ens) are small-headed, short-tailed lizards that also make their homes below ground.

BEHAVIOR AND REPRODUCTION

This nonpoisonous snake is a burrower and usually stays underground during the daytime. When it is above ground and feels threatened, it will curl up its tail to show off its bright underside. The snake appears to be an ovoviviparous (oh-vo-vie-VIH-puh-rus) species, which means that the female produces eggs, but they hatch inside her, and she actually gives birth to baby snakes. Females have up to fifteen young at a time. Like many other snakes that stay buried under the ground much of the time, false coral snakes have been studied very little by scientists. Further information about their behavior and reproduction remains a mystery.

FALSE CORAL SNAKES AND PEOPLE

People and false coral snakes rarely see one another.



CONSERVATION STATUS

The World Conservation Union (IUCN) considers the false coral snake to be Data Deficient, which means that scientists as yet have too little information to make a judgment about the threat of extinction. Destruction and other changes to their habitat, however, are probably threatening at least some populations.

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family CHAPTER

SUNBEAM SNAKES

Xenopeltidae

Class: Reptilia

Order: Squamata

Suborder: Serpentes

Family: Xenopeltidae

Number of species: 2 species

PHYSICAL CHARACTERISTICS

The two species of sunbeam snakes—the common sunbeam snake and the Hainan sunbeam snake—are among the world's most beautiful snakes. Their metallic-looking bodies shine different colors depending on how light bounces off them. When a sunbeam snake is in the shade, its back looks dark purplish brown or black, but when it slithers out into the sun, the large scales on its back and head erupt into a wave of color. Like a raindrop can bend sunlight to create a rainbow, this snake has scales that reflect sunlight into many colors. This property is called iridescence (IH-rih-DEH-sense). In fact, another common name for this snake is the iridescent earth snake. Young snakes, which are also iridescent, often have a white patch, or collar, on the upper neck.

Adults have slightly flattened bodies that are white, light gray, or light yellow on the bottom. The light color also extends up onto the lip scales. Sunbeam snakes have very small eyes on a head that is about the same diameter as the neck, so the head is not as obvious as it is in vipers, pythons, and many other snakes. The head flattens out toward the snout, giving it a wedge shape suited for digging. The skeleton also has some interesting features. The bone in the front of the upper jaw has teeth where most snakes do not. The snake's teeth are also all hinged at the base, rather than more firmly attached to the jaw bone, so they can wiggle back and forth a bit without falling out.

Adults usually reach about 2 to 3 feet (0.6 to 0.9 meters) in length. The tail makes up about one-tenth of the body's total

phylum

class

subclass

order

monotypic order

suborder

▲ **family**



“OLD” SPECIES

Scientists sometimes refer to some species, such as the sunbeam snakes, as being relicts (REH-lihks). Relict species are those that now live in a much smaller area than they once did. Typically, they have been on Earth for a very long time compared to other similar animals and have a set of features—usually something in the skeleton—that is similar to that seen in ancient animals, many of which are known only from their fossils. In some cases, relicts now live in widely separated areas, because the species in between died out over the years.

length. In snakes, the tail begins at the vent, a slitlike opening on the belly side.

GEOGRAPHIC RANGE

Sunbeam snakes live in southern China and Southeast Asia from the Nicobar and Andaman islands west of Thailand to the Philippines and south through much of Indonesia.

HABITAT

Sunbeam snakes spend at least part of their time underground, hidden in leaves or under trash. They live in humid forests, as well as rice paddies, farm fields, parks, and gardens next to the woods. People rarely see them deep in the forests, which may mean they do not travel there, but it may also simply mean people usually overlook them in that habitat.

DIET

Scientists have only studied the diet of the common sunbeam snake, which eats lizards, frogs, and snakes, as well as small mammals and birds. The snake is a very fast eater, swallowing its prey more quickly than most other snakes can. Scientists have not studied the other species.

BEHAVIOR AND REPRODUCTION

These snakes are nonvenomous (nahn-VEH-nuh-mus), or not poisonous. They stay out of sight most of the day, remaining underground in burrows. A sunbeam snake uses its wedge-shaped head to push through leaves, litter, and loose soil. Although it is capable of digging, it usually uses burrows made by other animals rather than making them itself. The snakes become more active at night and leave the burrows to hunt. They seem to keep up their guards when out at night, moving quickly with the head pressed against the ground and the tongue flicking about again and again to pick up any scents of other animals in the air. When they feel threatened, sunbeam snakes will shake the tail like a rattlesnake does, but the sunbeam snakes have no rattles, so the tail makes no noise. Nonetheless, scientists believe that the motion alone is enough to make an

attacker, also known as a predator (PREH-duh-ter), think twice about approaching the snake. Predators that come too close are greeted by a very bad-smelling material that oozes from the snake's vent area. If the predator actually touches the sunbeam snake, the snake will stiffen its body and jerk about wildly. Again, while this poses no danger to the attacker, the motion may be enough to cause the predator to leave the snake alone.

Female sunbeam snakes lay up to seventeen eggs at a time. Scientists know little else about their reproduction.

SUNBEAM SNAKES AND PEOPLE

Sunbeam snakes and people leave one another alone for the most part, but the snakes are starting to become more popular in the pet trade as more people become familiar with their color-changing scales. They make poor pets, however, because they remain underground most of the time and usually give off a bad odor when handled. They also are very nervous, and the stress is likely one reason they often die soon after they are purchased. In addition, the snakes do not reproduce well in captivity, which means that people must hunt them in the wild to supply the pet trade, rather than raise babies from already captured snakes.

CONSERVATION STATUS

These snakes are not listed as endangered or threatened.

SPECIES ACCOUNT



COMMON SUNBEAM SNAKE *Xenopeltis unicolor*

Physical characteristics: The common sunbeam snake has a dark purplish brown back, but its smooth scales shine in blues, greens, reds, and yellows when the animal slithers out on a bright, sunny day. Its belly is whitish. That whitish color extends into a collar around the back of the head and front of the neck in juveniles. The snakes have wedged-shaped heads that help them to dig into the soil. Adults usually reach less than 3 feet (0.9 meters) in length, but some can grow to 49 inches (1.25 meters).

Geographic range: The common sunbeam snake lives in southern China and Southeast Asia.

Habitat: The common sunbeam snake is semifossorial (SEM-ee-faw-SOR-ee-ul). “Fossorial” means it lives below ground, and the term “semi”

means they only spend part of their time there. They are most often seen at the edges of forests or in the farm fields and neighborhoods nearby.

Diet: In the wild, they eat lizards, especially skinks, as well as frogs, snakes, small mammals, and small birds. Captive snakes will eat mice.

Behavior and reproduction: This snake stays underground much of the day and comes out at night to hunt. In captivity, it kills mice by constriction (kun-STRIK-shun), which is the ability to squeeze a prey animal until it cannot breathe and therefore dies. When threatened, the common sunbeam snake will shake its tail and, if touched, will jerk its body. Females lay up to seventeen eggs at a time, and eggs reportedly hatch in about seven to eight weeks, but scientists know little else about its reproduction.

Common sunbeam snakes and people: The common sunbeam snake and people leave one another alone.

Conservation status: This snake is not listed as endangered or threatened. ■

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Sunbeam snakes spend at least part of their time underground, hidden in leaves or under trash. (Illustration by Jonathan Higgins. Reproduced by permission.)

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family CHAPTER

NEOTROPICAL SUNBEAM SNAKE

Loxocemidae

Class: Reptilia

Order: Testudines

Family: Loxocemidae

One species: Neotropical sunbeam snake (*Loxocemus bicolor*)

PHYSICAL CHARACTERISTICS

This family has only one species, the neotropical sunbeam snake. It also is known as a Mexican burrowing python, New World python, ground python, dwarf python, and burrowing boa, but it is actually neither a boa nor a python. Boas and pythons are in separate families. For many years, some researchers felt this snake was similar enough to the boas that it should be placed in the Boidae family, but now most agree that it should have its own family, as it does in this chapter.

The neotropical sunbeam snake has a small mouth, tiny cat-eyed pupils, and a somewhat-pointed, upturned snout. Its head is covered with larger scales than the rest of the upper body. The belly side of the snake is whitish, while the upper snake is brown, sometimes with small, white speckles. This obvious shift from the brown back to the white underside gives the snake its scientific name *bicolor* (“bi” meaning two). Its scales are slightly iridescent (IH-rih-DEH-sent), which means that they change color depending on how light bounces off them. Often, the neotropical sunbeam snake is confused with another family of snakes that lives in southeast Asia. The southeast Asian sunbeam snakes have iridescent scales much like those on the neotropical sunbeam snakes. One feature that helps to tell them apart is the presence of pelvic spurs, which are tiny bits of bone that stick out from the underside of neotropical sunbeam snakes near the vent, which is the slitlike opening on the belly side between the middle and end of the snake. Asian sunbeam snakes do not have spurs. Male neotropical sunbeam snakes have two

phylum

class

subclass

order

monotypic order

suborder

▲ **family**



WHAT IS CITES?

CITES is the Convention on International Trade in Endangered Species of Wild Fauna and Flora. Governments from all over the world volunteer to participate in CITES to control the buying and selling, called trade, of plants and animals from one country to the next. This is especially important for species that are threatened with extinction or otherwise in danger, because such collecting could possibly wipe out an entire species. CITES protects these plants and animals by listing each species under one of three sets of rules that control or ban almost all trade of animals. Currently, CITES protects about five thousand species of animals, including the neotropical sunbeam snake, and twenty-eight thousand species of plants.

noticeable pelvic spurs. Females also have spurs, but they are small and difficult to see. Young snakes look like smaller versions of the adults. They have the slightly iridescent, copper-colored skin, but they do not have any white speckles on their backs.

Neotropical sunbeam snakes have heavy muscular bodies. Adults usually are less than 3 feet (1 meter) long, but large ones can reach 5 feet (1.5 meters) in length. The short tail makes up only about 10 to 14 percent of its total body length. As in all snakes, the tail begins at the vent.

GEOGRAPHIC RANGE

This snake lives from southwestern Mexico through much of Central America, including Guatemala, El Salvador, Honduras, Nicaragua, and northwestern Costa Rica.

HABITAT

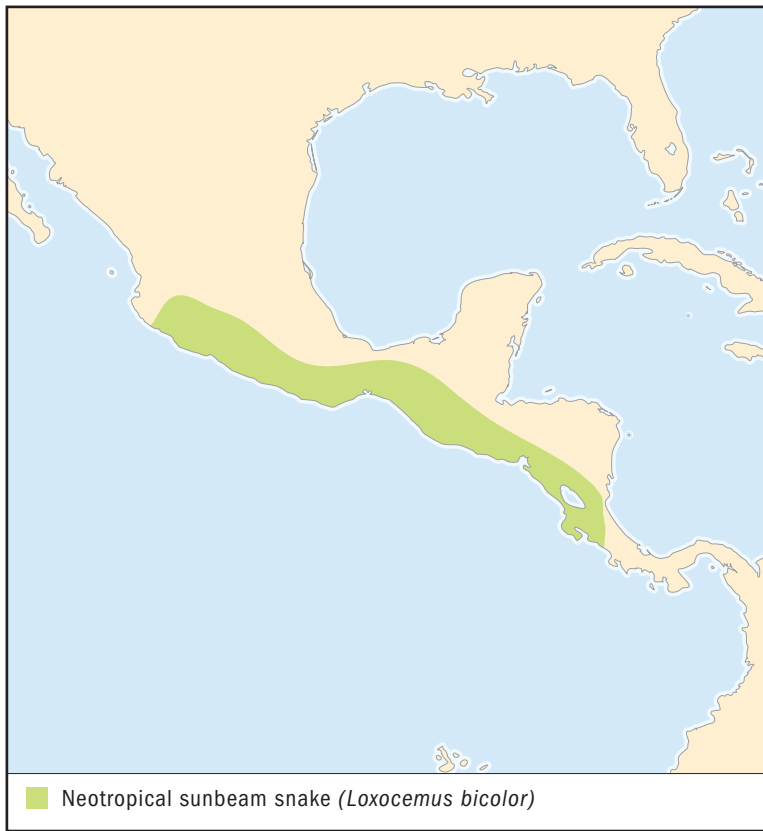
Neotropical sunbeam snakes live in warm climates and a variety of forested areas, but not in the mountains. They also sometimes make their home along the beaches of the coastline. They are secretive animals that hide among rocks and leaves, beneath logs and/or under their bark, in below-ground holes, and even in ant nests.

DIET

This snake will eat small mammals and adult and young lizards, including whip-tailed lizards. It also eats the eggs of black and green iguanas and olive Ridley seaturtles. The snake apparently crawls into the lizard and turtle nests, wraps its body around the eggs, then moves in with its head to swallow them whole. In captivity, the snakes will sometimes bite into the eggs, but then swallow the entire egg. A snake may eat several eggs, sometimes more than two dozen, at one time.

BEHAVIOR AND REPRODUCTION

Because this snake spends a good deal of its time underground, scientists know little about the details of its behavior in the wild



but have learned some information from captive snakes, which are held in various zoos around the world. They are called semi-fossorial (SEM-ee-faw-SOR-ee-ul) animals. “Fossorial” means that they spend time below ground, and adding “semi” points out that they frequently leave their underground homes. During the daytime, the snakes stay out of sight by using their upward-curved snouts to push through leaves to reach the ground, where they dig into loose dirt to make tunnels, or burrows. They come out at night and on rainy days to wander around above ground looking for things to eat. The white speckles on the backs of adults likely provide some camouflage. Like many other animals, the pattern on the skin breaks up the outline of their bodies and makes it more difficult for predators (PREH-duh-ters), or animals that hunt other animals for food, to spot them against the background habitat. For example, a completely dark snake slithering over a pile of leaves would be more noticeable than a snake with lighter patches that hide its outline.

Because the neotropical sunbeam snake spends a good deal of its time underground, scientists know little about the details of its behavior in the wild. (R. Wayne Van Devender. Reproduced by permission.)



The neotropical sunbeam snake finds its food by following scent trails or by simply spotting a mammal, lizard, or an egg. It is a constrictor (kun-STRIK-tuhr), which means that it coils its body around the animal it wants to eat, then tightens the coil until the animal passes out or dies. It then releases the coil, slides its head around, and eats the prey. As noted, it wraps its body around eggs but does not crush them.

During breeding season, male neotropical sunbeam snakes fight over females, sometimes biting one another in quite vicious battles. The males have sharp spurs near the vent. These spurs can apparently cut the female quite deeply during mating. About two months after mating, captive females commonly lay from two to four eggs at a time, although they can lay eight or more. Baby snakes in the wild hatch in May. When they reach four to five years old, they can begin to have their own babies.

NEOTROPICAL SUNBEAM SNAKES AND PEOPLE

This is not a typical pet species, probably because of its tendency to spend much of its time underground. The Convention on International Trade in Endangered Species (CITES) lists this species as one that people cannot freely buy and sell.

CONSERVATION STATUS

This species is not listed as endangered or threatened.

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BOAS

Boidae

Class: Reptilia

Order: Squamata

Family: Boidae

Number of species: 41 species

family

CHAPTER

phylum

class

subclass

order

monotypic order

suborder

▲ family

PHYSICAL CHARACTERISTICS

Boas come in many sizes, from small to very large. The adults of some species grow to less than 1 foot (about 0.3 meters) in length, but some are immense. The boa constrictor (kun-STRIK-tuhr), for example, reaches nearly 14 feet (4.3 meters) in length, and the green anaconda can grow to 25 feet (7.7 meters) in length and 300 pounds (136 kilograms). Among all the boa species, females are usually larger than males.

The boas are split into two subfamilies. One includes the sand boa, rubber boa, rosy boa, and eleven other species, none of which grows to much more than 4 feet (1.2 meters) in length. They all have small eyes, narrow heads on thick necks, large scales on the end of their snouts, and short tails. The tail in a snake is the part of the body behind the vent, a crosswise opening on the belly side of the snake and toward the rear of the animal. The other subfamily includes the anacondas, boa constrictors, and other mostly larger snakes. The smallest is the Abaco boa, which reaches just 31.5 inches (81 centimeters) in length, and the largest is the green anaconda, which can be about ten times as long. Members of this subfamily have large heads on smaller necks, large eyes, and long tails. The anacondas are different in that they have distinctively soft and loose skin.

Depending on the species, boas may be red, orange, yellow, green, brown, or gray and may or may not have patterns of blotches or spots on their backs. Some have scales that shine in different colors when the light strikes them in certain ways, and, in a few, the color of the skin changes completely from

dark in the daytime to light at night. For example, the Fiji Island boa can switch from black to pale pink within six hours. Two features that all boas share are the presence of heat sensors on the front of the face and two little bits of bone, known as spurs, that look like small claws. One spur lies on each side of the vent. The spurs are always noticeable in males but are sometimes small and not easily seen in females.

GEOGRAPHIC RANGE

Boas live in many places around the world, including South America, Central America, North America, Europe, Africa, and Asia. They are also present in New Guinea and on many islands throughout their range.

HABITAT

From fields to forests and marshes to deserts, boas live in many different habitats. Some of the sand boas make their homes in deserts, while others, like the viper boas, live in wet forests. Some species prefer warm climates, but others are able to exist in very cold areas, like southern Mongolia in Asia. The boa constrictor is unusual in that it can survive well in a wide variety of habitats, from deserts to rainforests in warmer climates and also grasslands in cooler areas.

DIET

While boas may spend some time slinking through their habitats looking for animals to eat, most of them are ambush hunters, which means that they find a good spot, wait motionless for a prey animal to wander by, and then strike out to grab it. The heat sensors on their faces help them “see” the heat coming from the prey, which helps them to hunt at night. The sand boas ambush prey by burying themselves in the sand and waiting for lizards or small mammals. Amazon tree boas coil around tree branches to ambush birds, and Puerto Rican boas sit still in the entrances to caves and watch for bats. Green anacondas, which are also called water boas, often lurk underwater until a passing fish or other animal comes within striking distance. Members of the boa family are constrictors, which means that the snake will kill its prey by looping its body around the animal and squeezing, cutting off the animal’s air until it is dead. While most boas eat small mammals, birds, or reptiles, the green anaconda and a few of the giant species eat quite large animals, including deer and crocodilelike caimans



A BIG MOUTHFUL

People are often surprised that a snake that looks so small can even get its mouth around what look to be impossibly large animals that make up its diet. A green anaconda, for example, can eat an entire deer. Snakes are able to do it, in part, because their lower jaws are different from those in a human. Unlike a person's lower jaw, a snake's jaw is split into left and right sides that are connected by stretchy muscle and tissue, called ligament (LIH-guh-ment). As the snake's teeth grasp the prey animal and draw it into the mouth, the lower jaw—one side at a time—moves forward and pulls the animal farther inside. The snake's head and then its neck stretch like elastic to become much wider than normal, so the prey can fit inside its body.

(KAY-muhns). Some reports, although extremely rare, indicate that green anacondas have killed and eaten humans.

BEHAVIOR AND REPRODUCTION

Boas frequently come out during the day to sunbathe, or bask, which warms their bodies. They are most active, however, at night. Some of their most interesting behaviors are seen in the ways they defend themselves. When threatened, many sand boa species roll the body into a ball with the head buried in the middle, and some of the short-tailed species poke out the tail to trick the attacker into thinking it is actually the head. The snake can survive a bite to the tail much better than a bite to the head. The Fiji Island boa flattens its head and neck much like a cobra, which makes the snake look bigger and may frighten off an attacker. Some of the larger boas hiss, strike, and bite when they feel threatened. They may also ooze a bad-smelling material from the vent area.

During breeding season, the males of some species wrestle over females, sometimes biting one another. In most species, the females give birth to baby snakes. A few, like the Calabar ground boa (sometimes mistakenly called a ground python, which confuses it with the python family), lay eggs.

BOAS AND PEOPLE

Many of the smaller species have little contact with humans. Some people hunt the larger boas for their skins and/or meat or to make medicines. Several species are popular in the pet trade.

CONSERVATION STATUS

According to the World Conservation Union (IUCN), one species is Endangered, facing a very high risk of extinction in the wild in the near future. In addition, four are Vulnerable, which means that they face a high risk of extinction in the wild in the near future, and two are Near Threatened and are at risk of becoming threatened with extinction in the wild in the future.

The U.S. Fish and Wildlife Service lists three species as Endangered. The low numbers of these snakes result from loss of their habitat and, in the case of the endangered Mona boa, from cats and rats that have been introduced to the area and prey on the snakes. In addition to these listed snakes, one species may be extinct, that is, no longer alive. Scientists have only one record of this species, called Cropan's boa or *Corallus cropanii*, which dates back to the mid-1900s.

SPECIES ACCOUNTS



BOA CONSTRICTOR *Boa constrictor*

Physical characteristics: Boa constrictors are usually brown with darker brown and somewhat triangular markings running down the back. The markings may become reddish on the tail, which explains their other common name: redbtail boa. The snakes have heads that are wider than their necks and long tails that they use to cling to tree branches. Boas can become quite large, with the longest reaching 13.8 feet (4.2 meters).

Geographic range: They are found in Mexico, throughout Central America, in much of South America, and on various nearby islands along the coasts of these areas.



The boa constrictor lives in many habitats, including evergreen and deciduous jungles, rainforests, near-desert areas, grasslands, and farm fields. (Illustration by Marguette Dongvillo. Reproduced by permission.)

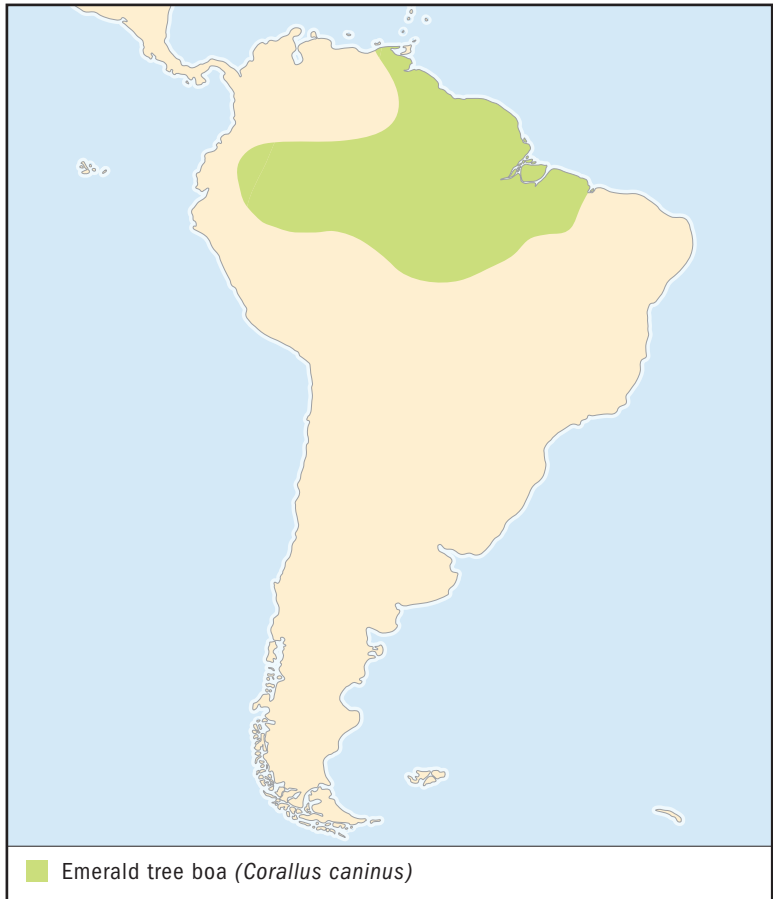
Habitat: The boa constrictor lives in many habitats, including evergreen and deciduous jungles, rainforests, near-desert areas, grasslands, and farm fields. Boas are good climbers and are often found in trees.

Diet: Boa constrictors usually dine on small mammals, like rats and squirrels, but also on birds, iguanas (ee-GWA-nuhs), and other large lizards. Large boas, which do most of their hunting on the ground, sometimes eat bigger animals, such as porcupines. Young boas are much more likely than adults to hunt for prey in trees.

Behavior and reproduction: Boas hunt for food mostly at night, spending the day inside cracks in tree trunks, in burrows made by tunneling animals, or in some other hiding place. Scientists know little about their mating behavior in the wild. Females, which give birth to baby snakes rather than eggs, may have twenty-one to sixty-one young at a time. The babies are about 19.5 inches (49.5 centimeters) long at birth. The young can have their own young once they are two to four years old.

Boa constrictors and people: Boa constrictors are rather common in the pet trade. They are often seen in farm fields, where the snakes find, kill, and eat many pest animals.

Conservation status: This snake is not endangered or threatened. ■



EMERALD TREE BOA

Corallus caninus

Physical characteristics: The emerald tree boa has a bright green back with white, diamond-shaped markings. The snakes have large, almost heart-shaped heads and long tails. They are not venomous (VEH-nuh-mus), that is, not poisonous, but have long front teeth—sometimes up to 1.5 inches (3.8 centimeters). Adults can grow to about 7.3 feet (2.2 meters) in length.

Geographic range: The emerald tree boa lives in the northern half of South America, near the Amazon River.

Habitat: This tropical species spends most of its life in trees, often in those with branches that hang over rivers.

Diet: An ambush hunter, the emerald tree boa waits patiently in trees for birds or small mammals, including monkeys, to approach. It then strikes out, grasps the animal with its long front teeth, and wraps its prey with its strong body. It then squeezes the animal to death before eating it.

Behavior and reproduction: This snake spends most of its time coiled around or looped over branches in trees. From this perch, it watches for a passing bird or other animal for its next meal. This is a live-bearing species, which means that the females give birth to baby snakes rather than laying eggs. The babies are often red or orange, but sometimes green. All change to green as they get older.

Emerald tree boas and people: Emerald tree boas are sought in the pet trade, but laws are helping to protect them in many countries.

Conservation status: This species is not endangered or threatened.



The emerald tree boa waits patiently in trees for birds or small mammals to approach. It then strikes out, grasps the animal with its long front teeth, and wraps its prey with its strong body. It then squeezes the animal to death before eating it. (Illustration by Marguette Dongvillo. Reproduced by permission.)



GREEN ANACONDA

Eunectes murinus

Physical characteristics: A long and large-bodied snake, the green anaconda can reach a length of 25 feet (7.6 meters) and 300 pounds (136 kilograms). An average adult is about 10 to 15 feet (3 to 4.6 meters). It is a dark green snake with round, black spots down the back and a black stripe behind each eye.

Geographic range: This snake lives in the northern half of South America and on the West Indies island of Trinidad.

Habitat: Also known as the water boa, the green anaconda is often found in freshwater marshes, swamps, ponds, and slow-moving



The green anaconda can reach lengths of 25 feet (7.6 meters) and 300 pounds (136 kilograms). (Joe McDonald/Bruce Coleman Inc. Reproduced by permission.)

streams or along their shores. The young often climb onto low branches along the water's edge.

Diet: Prey include birds, fish, turtles, crocodilelike caimans, and mammals, such as deer and monkeys. The snake kills the animals by coiling its body around them and squeezing.

Behavior and reproduction: Green anacondas are ambush hunters, waiting in the water near the shoreline for prey animals to approach. They sometimes wander onto land to sunbathe, or bask. The breeding season is in the dry season, when several males will approach a female for a chance to mate with her. The females give birth to twenty to forty-five baby snakes. Some of the young can be quite large, ranging from about 2 to 3 feet (61 to 91.4 centimeters) in length.

Green anacondas and people: Green anacondas and people have little contact. Their large size and bad temper make them poor pets. Although green anacondas can and do eat humans on extremely rare occasions, most stories of such activity are untrue.

Conservation status: This species is not endangered or threatened.

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family CHAPTER

PYTHONS Pythonidae

Class: Reptilia
Order: Squamata
Suborder: Serpentes
Family: Pythonidae
Number of species: 32 species

PHYSICAL CHARACTERISTICS

Some of the largest snakes in the world are pythons. One, the reticulated python, even holds the world's record for the longest wild snake at 33 feet (10.1 meters). That particular snake was killed in 1912 in Sulawesi, also known as Celebes, in Indonesia. Besides the reticulated python, however, only two other pythons grow to be longer than 20 feet (6.1 meters). In fact, the pygmy pythons of Australia are less than 2 feet (61 centimeters) long when full grown.

Pythons look much like boas. They both have cat's-eye pupils and little claw-like bits of bone, known as spurs, on each side of the vent, which is the slitlike opening on the belly side of the snake. They both also have heat vision and can "see" heat with little pits on the scales of their lips. Pythons and boas differ, however, in the location of these pits. In boas, they fall between scales, but a python's pits are in the middle of the scales. Both use the heat sensors to help them locate prey or food animals. Another major difference between the pythons and boas is that all pythons lay eggs, while all but three species of boas give birth to baby snakes.

Some pythons are almost completely one color, but many have patterns of blotches or bands on their backs. Often, the snake's scales are iridescent (IH-rih-DEH-sent), which means that they shine different colors depending on how the light hits them. A number of these snakes, including the Papuan python, can actually change color. This species can switch from having a bright yellow body and light gray head to completely dark brown from head to tail.

phylum
class
subclass
order
monotypic order
suborder

▲ family



SEVEN NEW PYTHON SPECIES

In 2000 and 2001, the number of python species grew by seven. The seven new species resulted not when someone found a new snake in the field, but when scientists decided that they had wrongly lumped those seven species in with other python species. Once they were removed and given new species names, the python family grew from twenty-five species to thirty-two. As studies into this family continue, scientists expect that they may find more species hidden inside the thirty-two, and the python family will grow yet again.

GEOGRAPHIC RANGE

Pythons are found in southern Asia; southeastern China and Southeast Asia; the Philippines; Papua, New Guinea, and Indonesia; and Australia. They also live in the central and southern region of Africa, which is known as Sub-Saharan Africa.

HABITAT

Depending on the species, pythons may live in thick forests, open forests, rainforests, rocky and scrubby areas high on hillsides, deserts, grasslands, swamps, or other freshwater areas. Some stay on land all their lives, while others spend much of their time climbing in trees. A few survive quite well in the desert, but others prefer the wetter areas, living in rainforests, or in some cases actually in a lake or other water area for up to six months a year.

DIET

Pythons are meat eaters and mostly feed on mammals and lizards, although some may take an occasional bird, and a few enjoy other species of snakes. They may crawl around looking for prey animals, but more often than not, they hunt by ambush. To ambush a prey, the snake remains still and waits for an animal to happen by and then lashes out to grab it.

Although it is very, very rare, some of the largest python species, including reticulated, African, and Indian pythons, have been known to coil around and then eat humans.

BEHAVIOR AND REPRODUCTION

Constriction (kun-STRIK-shun) is one of this family's best-known behaviors. After grabbing a prey animal in its jaws, the python wraps its body around the animal and constricts or squeezes so hard that the prey cannot breathe. When the animal dies or passes out, the snake uncoils and moves its head around to swallow the meal whole.

When they feel threatened, many will hiss, ooze a bad-smelling material from the vent area at the beginning of the tail, and possibly strike and/or bite. The ball python gets its name because it curls up in a ball when it feels it is in danger.

Pythons are mostly active at night, although they often will sunbathe, or bask, during the daytime in a warm spot. One species, the diamond python of Australia, hibernates, or enters a deep sleep, during the winter to survive the cold months. Scientists know little more about python behavior.

Pythons are an egg laying species. Females of small species, such as the pygmy python, lay up to ten eggs at a time. Larger females, such as the reticulated python, may lay more than one hundred. The eggs usually stick together in a clump. Females coil their bodies around the eggs, which protects them from other animals and keeps them warm. Some mothers can even heat up their bodies during this time by tightening and loosening the muscles. Occasionally, a female may leave the eggs while she goes out to sunbathe and then return to wrap the eggs in her heated body. Once the eggs hatch, the baby snakes usually look much like the adults, although they are sometimes more brightly colored.

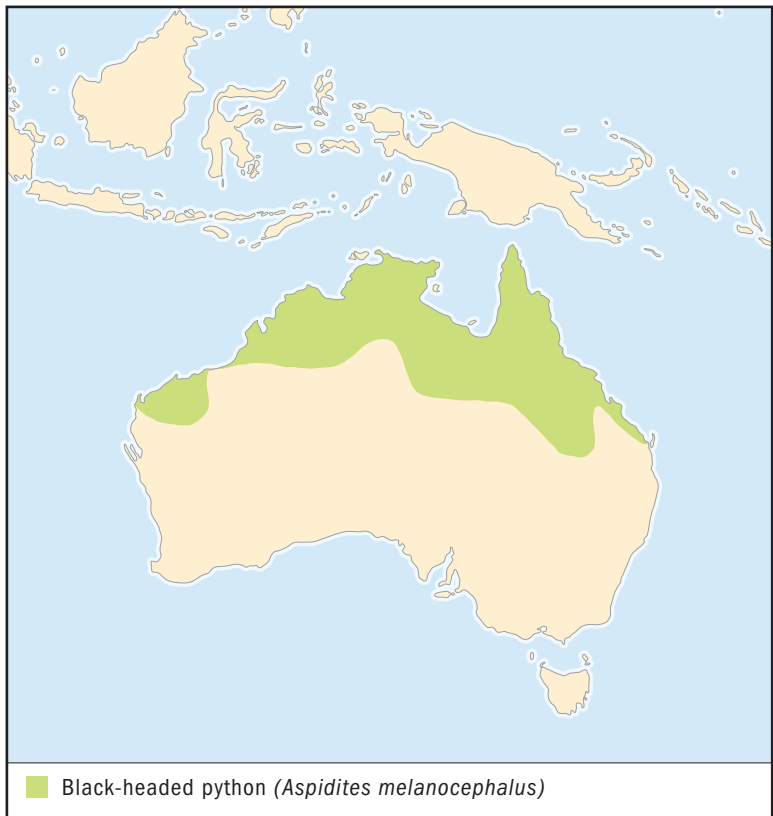
PYTHONS AND PEOPLE

People hunt pythons for their meat and skin and to make folk medicines. They are also popular in the pet trade, but most of the pet snakes now are born from other captive snakes rather than taken from the wild. Although some of the largest species are able to kill and eat humans, this hardly ever happens.

CONSERVATION STATUS

According to the World Conservation Union (IUCN), Ramsey's python of Australia is Endangered, which means that it faces a very high risk of extinction in the wild. The Asiatic rock python is listed as Near Threatened, which means that it is likely to qualify for a threatened category in the near future. The U.S. Fish and Wildlife Service also lists a certain group, called a subspecies, of the Indian python as Endangered, or in danger of extinction throughout all or a significant portion of its range. Overcollecting is a major problem for these snakes, and many countries now have strict rules in place to protect the pythons.

SPECIES ACCOUNTS



BLACK-HEADED PYTHON *Aspidites melanocephalus*

Physical characteristics: The black-headed python has a shiny black head and neck on a beige body. Its body is striped with medium-to-dark brown bands. Adults usually reach no more than 5 feet (1.5 meters) in length.

Geographic range: This species lives across northern Australia.

Habitat: This snake usually remains in wooded areas, but some travel into rainforests, grasslands, and dry and rocky areas.

Diet: Black-headed pythons eat mostly lizards and other snakes, including venomous (VEH-nuh-mus) or poisonous species. They will also eat birds and mammals once in a while.



Black-headed pythons eat mostly lizards and other snakes, including venomous species. (Illustration by Brian Cressman. Reproduced by permission.)

Behavior and reproduction: Active at night, this species spends part of its time in tunnels, or burrows, made by other animals. It is also able to dig burrows itself. The females, which are usually larger than the males, lay up to eighteen eggs at a time. Each egg measures about 3.5 inches (8.9 centimeters) long and hatches into a baby snake of approximately 2 feet (61 centimeters) in length. The babies look much like the adults but are more brightly colored. After four or five years, the young are old enough to have their own babies.

Black-headed pythons and people: Because it lives far away from people, the black-headed python and people rarely see or bother one another.

Conservation status: Although the World Conservation Union (IUCN) does not list it as threatened, scientists know little about the number of these snakes or how well they are surviving. ■



GREEN PYTHON

Morelia viridis

Physical characteristics: The green python is bright green in color and may have a pattern of small blue markings, sometimes forming a thin stripe down its back. It may also have a few white, yellow, and/or black scales scattered here and there on the green back. It has long straight front teeth and a long tail. Adults usually range from 4.5 to 6 feet (1.4 to 1.8 meters) in length; a few reach more than 7 feet (2.1 meters).

Geographic range: The green python lives in New Guinea and several nearby islands. A small group also makes its home on the Cape York Peninsula of far northeastern Australia.



The green python rests in branches much of the time by looping its body back and forth over a branch and drooping its head downward. (JLM Visuals. Reproduced by permission.)

Habitat: The green python, which is also known as the green tree python, lives in forests, often climbing up and through tree branches.

Diet: Although they are capable of climbing, adults usually hunt on the ground. They eat mainly rats and other rodents, although they will also feed on a bird occasionally, capturing it with their long teeth. Young snakes, in particular, eat lizards.

Behavior and reproduction: This snake rests in branches much of the time by looping its body back and forth over a branch and drooping its head downward. This pose almost looks as if someone had rolled the snake into a spiral and carefully laid it over the limb. The snake is most active at night and does the majority of its hunting then. In one of its hunting tactics, it keeps its body still while wiggling just the tip of its tail. The motion lures in lizards, which the snake attacks and kills. Females, which are usually larger than males, have up to thirty eggs at a time. The 1.6-inch (4-centimeter) eggs hatch into young snakes that are 11 to 14 inches (28 to 36 centimeters) long. Young snakes may be bright red with scattered yellow and white scales or vivid yellow with small red and white markings. They switch to green as they grow older. Once they reach three years old, the young can start having their own babies.

Green pythons and people: Some people hunt this snake for its meat.

Conservation status: This snake is not considered endangered or threatened. ■



RETICULATED PYTHON

Python reticulatus

Physical characteristics: One of the largest snake species known, the reticulated python can reach as much as 33 feet (10.1 meters) long. Normally, however, adults are about 12 to 15 feet (3.7 to 4.6 meters), although 20-foot (6.1-meter) individuals are often found. The snake has a beautifully patterned back of yellow, black, and brown.

Geographic range: Its range includes the Philippines and Indonesia, India's Nicobar Islands, and much of Southeast Asia.

Habitat: The reticulated python usually lives in or near freshwater swamps, rivers, and lakes, often making its home in thick or open forests, caves, or rocky areas.

Diet: Also known as the regal python, it eats many animals, including monkeys, rats and other rodents, dogs and cats, pigs, deer, lizards, and large birds. They will also kill and eat humans, although this is very rare.

Behavior and reproduction: This snake spends a good deal of its time either climbing in trees or swimming in the water. It tends to be more active at night, especially if it lives near people. It rests in hiding places, such as burrows made by other animals, or inside hollow logs. The reticulated python hunts by either sneaking up on an animal or by remaining still and letting the animal come to it. Large females can lay more than one hundred eggs at a time, while smaller females lay less than two dozen.

Each egg, which measures 4 to 5 inches (10 to 13 centimeters) long, hatches into a 2- to 3-foot (61- to 91-centimeter) baby snake. The babies look like the adults. Once the young snakes reach their third or fourth year, they are old enough to start having babies of their own.

Reticulated pythons and people: People hunt this snake for its lovely skin, its meat, and for use in folk medicines. Some ranchers kill the snake because they are afraid it will eat their farm animals, while others destroy it because they worry it will eat their children or another person. In addition, the snakes are popular in the pet trade, although their large size soon makes them difficult to keep.

Conservation status: Reticulated pythons are not listed as endangered or threatened, but scientists know little about their numbers in the wild. ■

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One of the largest snake species known, the reticulated python can reach as much as 33 feet (10.1 meters) long. (Illustration by Brian Cressman. Reproduced by permission.)

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family

CHAPTER

SPLITJAW SNAKE

Bolyeriidae

Class: Reptilia

Order: Squamata

Suborder: Serpentes

Family: Bolyeriidae

One species Splitjawsnake
(*Casarea dussumieri*)

PHYSICAL CHARACTERISTICS

The splitjaw snake has an upper jaw bone split into front and back halves that are hinged together at a point just below the eye. With this unusual split in the jaw, the bone holding the upper teeth in the front of the mouth can bend up and down, while the bone holding the back teeth can stay in place. No other bird, mammal, reptile, amphibian, or fish has such a strangely jointed jaw. For many years, this snake was considered to be a member of the boa family, but its odd jaw was so unusual that scientists felt it should be in its own family. Despite its listing in its own family, the splitjaw snakes often go by common names that still include the word “boa.”

Two members of this family existed in the 20th century, but only one has survived to enter the 21st century. The smooth-scaled splitjaw, also known as the smooth-scaled Round Island boa, is now believed to be extinct. The other species, the keel-scaled splitjaw, still exists today. The main difference between the two snakes is the presence or absence of small ridges, or keels, on the scales. Only the keel-scaled splitjaw has the ridges. In the splitjaws, as in other snakes, the ridges make the skin look a bit dull. Smooth scales, on the other hand, usually give snakes a shiny appearance.

The keel-scaled splitjaw is a thin snake with six-sided, or hexagonal (HEHK-SAE-guh-nuhl), scales running down its back. In many snake species, the back scales overlap, but the splitjaw's back scales barely touch each other, if at all. The snake has a long tail that makes up at least one-quarter of its entire

phylum

class

subclass

order

monotypic order

suborder

▲ **family**

body length. In snakes, the tail begins at the vent, a slitlike opening on the belly side. Its head is wider and flatter than the neck and is quite long, with an often noticeable black stripe behind the eye. Sometimes a white stripe lies alongside the black face stripe. The snake has a catlike pupil, but since its eye color is quite dark, the pupil is usually difficult to see. The upper body is light-to-dark brown, and the cream-colored belly is speckled with brown.

Some snake species have bits and pieces of leftover hip bones. In humans and other walking animals, the hip bones link to the leg bones, but since snakes have no legs, they do not need them. In splitjaws, no bits of hip bone remain. Adult keel-scaled splitjaws generally reach about 4 feet (1.3 meters) in length.

GEOGRAPHIC RANGE

Also known as the Round Island casarea boa, the keel-scaled splitjaw lives only on Round Island, which is located in the Indian Ocean east of Madagascar and just northwest of the island of Mauritius. At one time, this snake made its home on other small islands near Round Island and on the much-larger Mauritius, but now they live on just the one island. Round Island covers only 374 acres (151 hectares) and was created from lava ejected from a volcano. In the 1960s and 1970s, Round Island also had another species of splitjaw. During that period, observers on the island discovered a smooth-scaled splitjaw and watched the snake over a two-decade period. They were able to identify the snake from sighting to sighting by a distinctive scar on its body. They saw that lone snake on Round Island for the last time in 1975, and no one has ever seen a smooth-scaled splitjaw again. The discovery of the living snake was quite fortunate, because scientists would otherwise have never known of this species. While fossils of many other living and extinct snake species have been found, no one has ever found and identified a fossil from the smooth-scaled splitjaw.

HABITAT

The keel-scaled splitjaw prefers to live in the lush palm-covered rainforest of Round Island. Because much of the rainforest is now gone, however, the snake is surviving among stumps, scraggly bushes, and what few areas of thick forest it can find. The snake stays underground much of the time and therefore relies on proper soil conditions. Unfortunately, hu-

mans introduced animals, such as rabbits and goats, to the island. These animals eat plants and have completely wiped out many of the plants native to Round Island. Without the plants and their roots to hold the soil in place, rain can wash away and wind can blow away the soil that makes up the snake's habitat. Now, scientists estimate that 90 percent of the soil has disappeared.

DIET

A picky eater, the keel-scaled splitjaw snake eats little other than lizards, especially the day gecko and two types of skink. The splitjaw catches the slender and often-quick lizards during the day by remaining motionless and waiting for a lizard to accidentally come too close. The snake then strikes out and grabs the passing lizard. At night the splitjaw tries a different method. It hunts down the lizards using its senses of smell and sight. While holding most of its body close to the ground, the snake raises up its head a few inches (6 centimeters or so) and flicks its tongue. The tongue picks up scent chemicals in the air. It then slowly sneaks up on the lizard by slithering forward almost in a straight line, and when it gets near enough, strikes out to grab the animal.

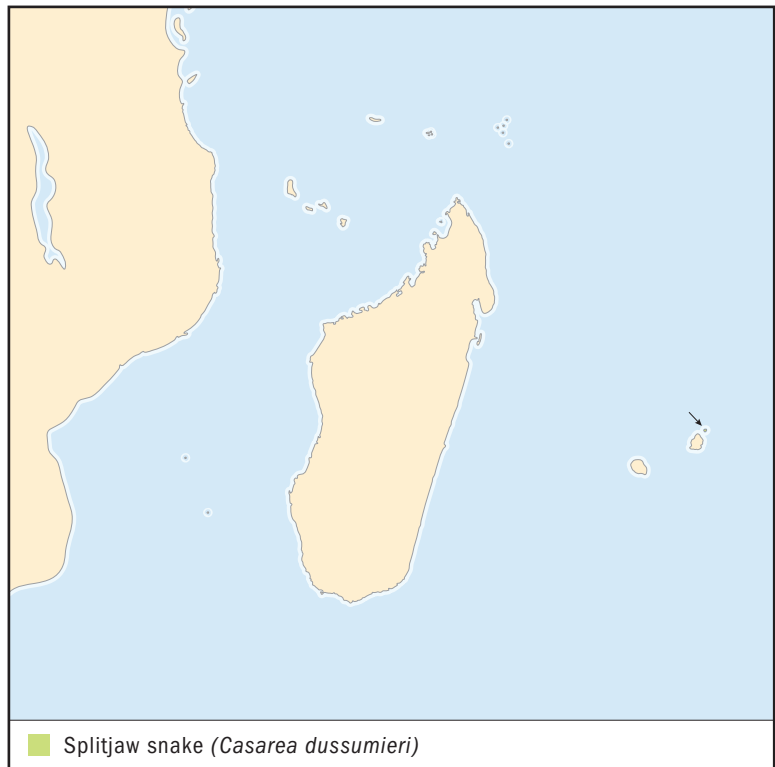
BEHAVIOR AND REPRODUCTION

The keel-scaled splitjaw snake is mainly active at night, although it does do some hunting during the day. It usually stays on or under the ground, probably spending a good deal of its time in small moist tunnels, or burrows, which provide a safe hiding place. Splitjaw snakes will also climb up shrubs and tree limbs, sometimes reaching heights of 8 feet (2.5 meters). Scientists knew very little about the reproduction of this species until the Jersey Wildlife Preservation Trust, a group in the United Kingdom that tries to save endangered animals by breeding them in captivity, were able to get two captive snakes to mate successfully



ISLAND SNAKES

How do snakes, such as the keel-scaled splitjaw, get to islands? Although most people do not consider snakes to be swimmers, many of them can swim quite well for at least short distances. This explains how they reach islands close to shore, but sometimes snakes are found on islands far out in the ocean. In this case, some of them may have floated by climbing onto a large branch that was broken off a coastline tree and fell into the surf, or possibly they may have stowed away on a boat or a plane and slithered on shore after landing on the island. Another possibility is that a bird snatched up a snake on the mainland and held it in its claws to kill and eat later, only to accidentally drop it when it was flying over an island. Even though snakes can reach islands in many ways, some islands still have few, if any, of these animals. For example, only one species of land-living snake occurs on Hawaii. The snake, called the Brahminy blind snake, came to Hawaii from Asia probably in a shipping carton.



in 1982. The female laid eggs. Since then, other female keel-scaled splitjaws have laid eggs, too. No one has observed the snakes mating in the wild, but in captivity, they seem to mate most successfully from March to July and lay eggs from May to October. A female typically lays three to eleven soft-shelled eggs at a time, possibly laying them in a hidden spot, such as within a pile of leaves or inside a hollow tree trunk. Females may stay with the eggs for a while. When they hatch in about three months, the young are bright orange.

SPLITJAW SNAKES AND PEOPLE

People rarely see this snake in the wild.

CONSERVATION STATUS

The World Conservation Union (IUCN) and the U.S. Fish and Wildlife Service consider the Round Island casarea splitjaw to be Endangered, or facing a very high risk of extinction in the wild throughout all or a significant portion of its range. It once lived on the nearby and much larger Mauritius Island,



The splitjaw snake has an upper jaw bone split into front and back halves that are hinged together at a point just below the eye. (Illustration by Marguette Dongvillo. Reproduced by permission.)

but habitat loss, combined with the presence of non-native species, wiped out the splitjaws. On Round Island, the snakes had to survive the loss of the rainforest. In the 1970s, people became aware of the problems faced by the snakes and other animals on Round Island and set out to remove the non-native goats and rabbits that were eating the native plants, and therefore destroying the soil conditions needed by the snake. Now, to protect the rainforest further, only scientists and conservationists are allowed to visit Round Island. Plans are under way to remove non-native animals from a few other nearby small islands where the splitjaws once lived and possibly release some captive-bred splitjaws there. The hope is that the snakes will survive to breed and produce a wild population.

The U.S. Fish and Wildlife Service lists the smooth-scaled splitjaw as Endangered, but the World Conservation Union (IUCN) lists it as Extinct. No one has seen that species, also known as the Round Island bolyeria boa, since 1975.

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family

CHAPTER

WOODSNAKES AND SPINEJAW SNAKES

Tropidophiidae

Class: Reptilia

Order: Squamata

Suborder: Serpentes

Family: Tropidophiidae

Number of species: 25 species

PHYSICAL CHARACTERISTICS

The woodsnares and spinejaw snakes are small-to-medium-sized snakes that resemble boas. Colors range from gray to brown, and most have faint blotches or stripes. Some have smooth scales, and others have scales with ridges, or keels. Among those with smooth scales, the Oaxacan dwarf boa has scales that shine different colors depending on how the light hits them. Scales that do this are known as iridescent (IH-rih-DEH-sent). On the other hand, some members of this family have dull-looking scales with noticeable keels. The Cuban black and white dwarf boa even has scales that change color from darker during the daytime to lighter at night.

The smallest member of this family is the Cuban dusky trope, which reaches at most 12 inches (30 centimeters) long. The largest is the dusky dwarf boa, which can grow to 41 inches (104 centimeters) in length.

Some people believe that this family should be split in two with one keeping the name Tropidophiidae and the other falling under a new family called Ungaliophiidae. Occasionally, some books will place these snakes under the family Boidae, but although some have the common name of dwarf boas, they are not actually boas.

GEOGRAPHIC RANGE

They are found from Brazil to Mexico and in the West Indies. Some species are found in both Malaysia and Borneo.

phylum

class

subclass

order

monotypic order

suborder

▲ **family**



WORLD TRAVELERS

Humans have helped many species move from one place to another. Sometimes, people purposely introduce a new species. For example, people who move to a new country frequently bring along a favorite plant to put it in the garden and remind them of the homeland. Often, however, animals hitchhike with people when they travel. The woodsnakes and spinejaw snakes are no exception. The Panamanian dwarf boa has made its way from its home in Central America to both Europe and the United States by stowing away in bunches of bananas.

HABITAT

Different members of this family may prefer dry and open, shrubby forests; rainforests; the rocky sides of hills, as well as cliffs; farm fields; and even caves. Usually, they try to find a spot within the habitat that has conditions falling about halfway between wet and dry. Only two species make their homes high in mountains. Several species within this family are so rarely seen that they are only known by their scientific names.

DIET

Much of the information about the diet of these snakes comes from captive snakes rather than those in the wild. The West Indian species of the genus *Tropidophis* eat anoles, which are small, long-tailed lizards. Species in the genus *Exiliboa* feed on small salamanders and on frog eggs, while those in the genus *Trachyboa* make both fishes and amphibians part of their diet. Amphibians include such animals as salamanders and frogs.

The dusky dwarf boa, which is the largest member of the family, will eat small mammals and birds. In captivity, many larger snakes in this group will eat baby mice.

BEHAVIOR AND REPRODUCTION

The snakes spend a good deal of time actively, but slowly, slithering through their habitat, apparently on the hunt for food. Scientists suspect that they also find hiding places, where they remain still and wait for the meal to come to them. This tactic, called ambush, is very effective for snakes like these that blend into the background very well. Most of the woodsnakes and spinejaw snakes live on the ground, but a few will also climb a few feet into trees or shrubs. The bromeliad woodsnakes are the best climbers in the family and will slink into plants, known as bromeliads (broh-MEE-lee-ads), that grow on the trunks and branches of tall trees.

Most of the woodsnakes and spinejaw snakes are active mainly at night, but they also come out during the day to sunbathe, or bask. When they feel threatened, the majority of the

species will roll their bodies into a ball, rather than strike and bite as many other snakes do. Members of the genus *Trachyboa* coil into a flat disk instead of a ball, burying the head in the center of the disk. If an attacking animal, or predator (PREH-duh-ter), bites at a woodsnake, a bad-smelling material may ooze out of the snake's vent, a slitlike opening on the belly side of the animal. The odor is sometimes enough to cause the predator to leave. Only rarely will the snake bite back at an attacking animal. Some species in the genus *Tropidophis* have a rather unusual way of protecting themselves from predators. If a predator bothers them enough, they will begin to bleed from the mouth, nostrils, and eyes. Because the bleeding, or hemorrhaging (HEHM-rih-j-ing), can start automatically—even though the snake has no injury—it is called autohemorrhaging (aw-toe-HEHM-rih-j-ing).

Female woodsnakes and spinejaw snakes give birth to baby snakes, instead of eggs. Few people have studied this snake, so little additional information is available about their reproduction or behavior.

WOODSNAKES, SPINEJAW SNAKES, AND PEOPLE

Some are occasionally captured for the pet trade, but for the most part, people have little if any contact with these snakes.

CONSERVATION STATUS

This species is not listed as endangered or threatened. One species, the Navassa woodsnake, was noted as extinct in the 1990s, likely due to changes in its habitat and deaths from mongoose attacks. A mongoose is a ferretlike, meat-eating animal that is an excellent hunter.

SPECIES ACCOUNT



SOUTHERN BROMELIAD WOODSNAKE *Ungaliophis panamensis*

Physical characteristics: Also known as the bromeliad boa, bromeliad dwarf boa, and banana boa, the southern bromeliad woodsnake is a thin, light gray or tan snake with black triangular marks on its back. It has smooth scales along its body with one large scale on top of its snout. Adults reach about 30 inches (76 centimeters) in length.

Geographic range: They live in Costa Rica, Nicaragua, and Panama in Central America and also in Colombia in northern South America.

Habitat: It lives in a variety of forests, except those of the mountains, often crawling among the plants that grow on the upper branches and high up in the trunks of trees. It also spends considerable time on the ground.

Diet: In captivity, southern bromeliad woodsnakes will eat lizards or rodents, although young snakes typically will only eat lizards. Scientists know little about their diet in the wild, but it probably includes lizards and frogs.

Behavior and reproduction: A mild-mannered snake, this species does not bite human handlers. Even when threatened, it will not bite and instead simply coils into a ball to wait for the danger to pass. It has another defense, however, which it will use if it feels particularly frightened. That defense is an ooze that seeps from its vent and has a strong enough smell to scare off most attackers. Females do not lay eggs and instead have baby snakes. The young are about 6 inches (15 centimeters) long at birth. Scientists know little else about this snake's behavior or reproduction.

Southern bromeliad woodsnakes and people: People rarely see this snake in the wild or in pet stores.

Conservation status: Scientists know so little about this snake, including how many of them live in the wild, that they cannot make any statements about its conservation status. ■

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Much of the information about southern bromeliad woodsnakes comes from captive snakes rather than those in the wild. (Illustration by Emily Damstra. Reproduced by permission.)

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family CHAPTER

FILE SNAKES Acrochordidae

Class: Reptilia

Order: Squamata

Family: Acrochordidae

Number of species: 3 species

PHYSICAL CHARACTERISTICS

Also known as wart snakes or elephant-trunk snakes, the file snakes have baggy skin that lies in loose folds. The skin is covered with tiny scales and small, bristly outgrowths that make the skin seem quite rough. This rough skin looks rather like the surface of a file, and some say it also looks as if it is covered with small warts; it is the appearance of their skin that gives them the common name “file” snakes. Although for many years people thought that the little file snake was venomous (VEH-nuh-mus), or poisonous, and dangerous to humans, scientists now know that none of the three file snake species, or types, has a bite that can harm a person.

File snakes spend nearly their entire lives in the water. A file snake has both its eyes and its nostrils, or nose holes, located on the top of its short head, so it can breathe the air and see above the water surface while the rest of the body remains underwater. The nostrils also have little valves, or flaps, that can close up when the snake dips completely below the water’s surface. The tail is somewhat flattened from side to side and helps the snake swim. Male and female file snakes look very much alike, except that the females have slightly larger heads, thicker bodies, and shorter tails. The tail on a snake is the part of the body that extends back from a slit on the belly. File snakes range in length from about 20 to 76 inches (0.5 to 2 meters). The little file snake is the smallest member of the family, averaging 20 to 28 inches (51 to 71 centimeters) in length but sometimes reaching 40 inches (1 meter). The Arafura file snake grows to

phylum

class

subclass

order

monotypic order

suborder

▲ **family**



A DIFFERENT WAY TO SHED

A little file snake sheds its skin differently from the typical land-living snake, which turns its skin inside out as it scoots out of the old skin. Instead, the little file snake first wriggles its body free of its loose skin, so that the skin is separate from the body but still in place around it. Then it works its way free, sometimes knotting its body to help it escape from the old skin. The skin remains right side out.

about 67 inches (1.7 meters), and the Java file snake grows to 76 inches (2 meters).

GEOGRAPHIC RANGE

The file snakes live from India to Southeast Asia and Australia. They inhabit northern Australia, the Solomon Islands east of New Guinea, Malaysia, and Indonesia.

HABITAT

The file snakes usually live in warm, shallow waters. The Arafura and Java file snakes live in freshwater streams; lagoons, or shallow bodies of saltwater near the sea; and rivers. In the dry season, the Arafura file snake is also found in billabongs (BILL-uh-bongs), which are dried-up streambeds. During the rainy season, it will slither into flooded grasslands. The Java file snake, on

the other hand, occasionally swims into the salty ocean water for short periods of time. Little file snakes can live in both freshwater and saltwater areas, from the ocean to swamps near the coastline and to inland rivers, sometimes up to 6 miles (9.6 kilometers) out to sea and in water up to 66 feet (20 meters) deep. Little file snakes have salt glands, small groups of cells that may help them control the amount of salt in their bodies. Salt glands are also seen in many other animals that live in salty waters. Scientists have not studied this gland in detail, however, so they are unsure how important it is to the snake's survival in saltwater.

DIET

The three file snake species eat mostly fishes, and they do not seem to care whether the meal is alive or dead when they find it. The little file snake also eats crustaceans (krus-TAY-shuns). Crustaceans include shelled animals, such as shrimp and crayfish. The Java file snake adds freshwater eels to its diet of mainly catfishes. The Arafura file snake can eat very large fishes. According to one report, a snake that measured 44.5 inches (113 centimeters) in length ate a 19-inch-long (48-centimeter-long) fish—nearly half the snake's size—in just two minutes.

BEHAVIOR AND REPRODUCTION

The file snakes rarely leave the water, but they occasionally move from one body of water to another during the wet and dry seasons or when ocean water levels rise and fall due to the tides. During the daytime, they stay among roots, in holes in the muddy water bottom, or in other hiding places and come out to hunt for food at night. Using the bristles in the outgrowths on their skin, file snakes can sense changes in the murky, or dark, water, which helps locate animals that they might otherwise be unable to see. To hunt, a file snake either will strike out and grasp a passing fish with its mouth or will quickly wrap its body around the fish and hold it until the snake can reach around with its head to bite and eat the fish. Unlike constrictor (kun-STRIK-tuhr) snakes that wrap around and squeeze their prey to death before eating it, the file snake coils around the prey only to hold it temporarily until it can quickly gulp it down. Although they can swim quite well, adults usually move slowly along the bottom. Scientists know very little about the behavior of young file snakes.

Java and little file snakes have young every other year, and Arafura file snakes have young even less often. All of the three species lay eggs, probably from the middle of the wet season to late in the wet season. The little file snake has about five eggs at a time, the Arafura file snake has about seventeen, and the Java file snake lays an average of twenty-six eggs. At least among the Arafura file snakes, larger females have a larger number of young.

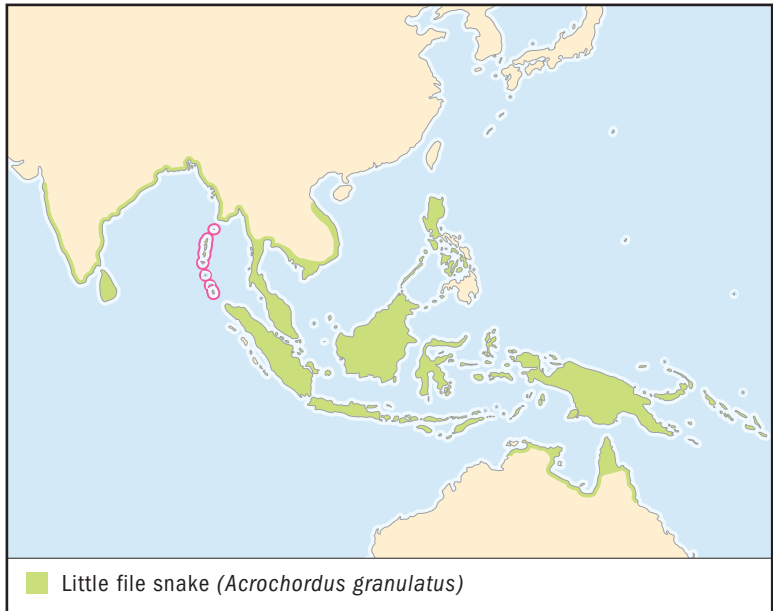
FILE SNAKES AND PEOPLE

Some people collect file snakes as food and for their skin, which is used for leather. Since the snake reproduces only once every two years, or even less often, such collecting over the years could lead to dangerous drops in the numbers of snakes. People only rarely collect file snakes for the pet trade.

CONSERVATION STATUS

File snakes are not considered threatened, but some populations may have low numbers. Habitat loss, as well as habitat damage from water pollution, or dirtying and poisoning of water, may hurt their ability to survive into the future. In areas with large fish populations, however, file snakes can become very numerous. Scientists have counted 100 or more Arafura file snakes on every 2 acres (0.8 hectare) of some Australian billabongs.

SPECIES ACCOUNT



LITTLE FILE SNAKE *Acrochordus granulatus*

Physical characteristics: The little file snake is rough skinned, with a thick body and a small head. Its back is dark brown with yellowish to reddish stripes. It has loose, baggy skin. Little file snakes are the smallest of the three file snake species, at about 20 to 28 inches (51 to 71 centimeters) long.

Geographic range: The little file snake lives from the western coast of India through the tropical regions of Southeast Asia (including Indonesia and the Philippines) to New Guinea and northern Australia.

Habitat: This snake is mainly a saltwater animal, although it can also live in freshwater. It usually is found in shallow water just a few feet deep, but it has also been seen in ocean water up to 6 miles (9.6 kilometers) from shore and 66 feet (20 meters) deep.

Diet: The little file snake eats mainly the spiny-finned fishes called gobies (GO-bees) and other goby-like fishes and crustaceans.

Behavior and reproduction: This snake rarely leaves the water. It can easily stay underwater for two hours and, if necessary, up to five hours at a time. Although it is a very good swimmer, it usually moves slowly along the muddy water bottom. It is active mainly at night, when it hunts for food. These snakes probably mate in the fall. The females lay eggs about once every other year. A typical litter has five eggs, but there may be as few as one egg or as many as twelve. Larger females have larger numbers of young.

Little file snakes and people: Some people hunt little file snakes for their skin, which is used as leather.

Conservation status: The little file snake is not considered to be endangered or threatened. ■

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The little file snake can easily stay underwater for two hours and, if necessary, up to five hours at a time. (Illustration by Wendy Baker. Reproduced by permission.)

VIPERS AND PITVIPERS

Viperidae

Class: Reptilia

Order: Squamata

Suborder: Serpentes

Family: Viperidae

Number of species: 256 species

family

CHAPTER

phylum

class

subclass

order

monotypic order

suborder

▲ family

PHYSICAL CHARACTERISTICS

Vipers and pitvipers are mainly known for the pair of short hollow fangs that usually lie flat in the upper jaw but swing down when the snake opens its mouth to inject its venom. The members of this family are typically rather thick snakes with large triangular-shaped heads, usually catlike eye pupils, and short tails. The tail in a snake is the part of the body behind the vent, a slitlike opening on the belly side of the animal. Those snakes that spend much of their time climbing among shrubs and trees have longer tails. Some vipers and pitvipers have zigzag, diamond-shaped, or other patterns on their backs, but for the most part, vipers and pitvipers have no showy colors and instead simply blend into the background, which often makes them difficult to spot.

The pitvipers are unusual because each has a rattle on the end of the tail and a small but deep pit on either side of the face. The rattle is made of little segments of fingernail-like material that make a noise when they knock against one another. The snake gets a new segment every time it sheds, but the oldest segments frequently fall off. The pits on the snake's face are sensitive to temperature, so the pitvipers have infrared (IN-fruh-red) vision, which is the ability to detect, or to "see," heat.

Vipers and pitvipers come in different sizes. The smallest member of the family is the dwarf puff adder, which grows to about 12 inches (30.5 centimeters). The largest are some of the pitvipers, which reach 11.8 feet (3.6 meters) in length.

GEOGRAPHIC RANGE

Vipers and pitvipers are found in North, Central, and South America and in Africa, Europe, and Asia.

HABITAT

Most members of this family live on land, but some, such as the cottonmouth, spend a good part of their time in the water. Vipers and pitvipers make their homes in warm tropical climates and in cooler temperate climates that have distinct seasons, including cold winters. Temperate species often move from one habitat to another during the spring, summer, and fall and then hibernate through the winter. For example, North America's eastern massasauga rattlesnake spends the early spring near wetlands, moves into drier nearby fields for the hot summer months, and hibernates back near the water in underground burrows made by crayfish or small mammals. During hibernation (high-bur-NAY-shun), the animal enters a state of deep sleep that helps it to survive the frigid weather.

DIET

Vipers and pitvipers eat mice, rats, and lizards, but they will also feed on birds, frogs, and other animals. A few of the smallest species eat locusts, a type of grasshopper.

Vipers and pitvipers are predators (PREH-dih-ters) and use their venom when hunting prey or sometimes when defending themselves. The venom attacks the blood system of the prey, producing burning pain and other symptoms, and later stopping the heart. A few vipers and pitvipers have venom that also attacks the nervous system. Some species slowly slither along looking for prey animals, but others rely on their camouflage-like colors to hide them until an unsuspecting animal happens by. In either case, the snake lashes out at the prey animal with great speed, opening its mouth to swing down its fangs and biting the animal to inject the venom—all in the blink of an eye. The prey never even sees the snake until it is too late.

BEHAVIOR AND REPRODUCTION

The defense behaviors of the vipers and pitvipers are perhaps their best-known feature. The snakes coil up into a flat spiral with the head curved up from the middle of the coil. Some also hiss, jerk forward with the head, rattle the tail, or blow up the



FIGHTING SNAKE BITES

Although many snakes are harmless to humans, some produce venom and can be quite deadly. People who have been bitten by a venomous snake often receive antivenin (an-tee-VEH-nuhn) to stop the venom from doing its damage. To make antivenin, a snake handler forces a venomous snake to bite and release its venom into a container. When enough is collected, the venom is injected into a horse. The horse's body, which is much larger than a human's, fights off the venom by making special proteins, called antibodies. Laboratory technicians collect these antibodies to make antivenin. Usually, one type of antivenin is good at attacking only one type of venom, so a medical doctor tries to learn exactly what species of snake bit the patient before giving the antidote or cure.

body, which makes the snake look larger. Each of the behaviors may be enough to scare off a predator. Many of the warmer climate species remain active all year long, but the temperate species may hibernate for many weeks. Those living high up in the mountains and other places with especially cold winters typically hibernate for several, sometimes up to eight, months a year.

Males mate every year in the spring or fall, sometimes wrestling with other males over the chance to mate with a female. Females, especially those in colder climates, often skip a year or more between matings. The females of most species produce eggs, but these hatch inside her body so that she gives birth to baby snakes. A few species, such as the night adders, lay eggs instead. Recent research suggests that some mothers may linger around the young for a few days, possibly providing some protection against predators that may hunt them for food.

VIPERS, PITVIPERS, AND PEOPLE

While viper and pitviper bites of humans are quite rare, they do occur often enough and cause enough deaths to be a concern in some areas. For this reason, people often kill vipers and pitvipers, along with any other snakes that remotely resemble them. In addition, people hunt and kill these snakes to use in medicines.

CONSERVATION STATUS

According to the World Conservation Union (IUCN), seven species are Critically Endangered; four species are Endangered; seven species are Vulnerable, and one species is listed as Data Deficient. The Critically Endangered species face an extremely high risk of extinction in the wild, while the Endangered species face a very high risk, and the Vulnerable face a high risk. Scientists have too little information on those noted as Data Deficient to make a judgment about the threat of extinction. The U.S. Fish and Wildlife Service lists one U.S. and one foreign

species as Threatened or likely to become endangered in the foreseeable future, and one foreign species as Endangered or in danger of extinction throughout all or a significant portion of its range. Overall, the loss of habitat and outright killing of the snakes by humans are the greatest risks the snakes face.

SPECIES ACCOUNTS



HORNED VIPER *Cerastes cerastes*

Physical characteristics: A thick snake with a short tail, the horned viper has a triangle-shaped head and a long scale over each eye that pokes up like a horn. Some individuals have a ridge over their eyes instead of the two tall horns. They have brown blotches down a gray, yellow- or red-tinged back, and the back and head scales have ridges, or keels. Adults are quite small, usually growing to just 11.8 to 23.6 inches (30 to 60 centimeters), although a few reach 2.8 feet (85 centimeters).

Geographic range: Horned vipers are found in northern Africa and the eastern Sinai.



Unlike most snakes, the horned viper can dig into the ground and bury itself. It waits, often with just its horns above the ground, for a prey animal to walk nearby and then strikes and bites the animal. (©Gregory G. Dimijian/Photo Researchers, Inc.)

Habitat: This species lives mostly in sandy areas, sometimes marked with stones and rocks.

Diet: They eat other animals of sandy habitats. These may include small mammals, lizards, and birds.

Behavior and reproduction: This snake is active at night. It hides during the day beneath rocks or in underground tunnels made by other animals. Unlike most snakes, the horned viper can dig into the ground and bury itself. It waits, often with just its horns above the ground, for a prey animal to walk nearby and then strikes and bites the animal. When it slithers, the horned viper slides sideways across the sand in what is known as sidewinding. This is an egg-laying snake, and the females lay between ten and twenty-three eggs at a time.

Horned vipers and people: Since it hides during the day, people rarely see the horned viper. It does, however, sometimes bite people, but the bites are not thought to be that dangerous.

Conservation status: This species is not considered endangered or threatened. ■



COTTONMOUTH

Agkistrodon piscivorus

Physical characteristics: The cottonmouth gets its common name from the white, cottonlike color inside its mouth. Also known as the water moccasin, it is a large thick snake. Younger adults have brown or reddish bands on a yellowish background, while older individuals are usually all brown, greenish brown, or black. Juveniles have tails that are tipped with yellow or green. In the wild, adults may reach 5.9 feet (1.8 meters) in length and weigh 10 pounds (4.6 kilograms).

Geographic range: They are found in the southeastern quarter of the United States.

Habitat: The cottonmouth spends most of its time in or near the water, although it will sometimes crawl some distance onto land.



The cottonmouth spends most of its time in or near the water, although it will sometimes crawl some distance onto land. (Joe McDonald/Bruce Coleman Inc. Reproduced by permission.)

Diet: Cottonmouths will eat almost any animals they find. This includes birds, eggs, living and sometimes dead fishes, frogs, small alligators and turtles, snakes and other cottonmouths, and mammals.

Behavior and reproduction: Cottonmouths spend much of their time coiled up and out in the open. They hunt for food by swimming or slithering around looking for it or by staying still and waiting for the prey to mistakenly come a little too close. When they feel threatened, cottonmouths will strike and bite, but usually they remain motionless until the threat passes. Snakes that live in warmer areas are active all year, but those living in colder areas hibernate during the winter. During mating season, males sometimes fight one another for the chance to mate with a female. Females give birth to baby snakes instead of eggs in August or September. They have up to sixteen young at a time.

Cottonmouths and people: Although most cottonmouths are content to leave people alone, bites do occur. The venom is dangerous to humans and can be fatal. Humans also pose a great risk to the snakes by draining wetlands and otherwise destroying their habitat and also by killing the snakes out of fear.

Conservation status: This species is not considered endangered or threatened. ■



TIMBER RATTLESNAKE

Crotalus horridus

Physical characteristics: The timber rattlesnake is a thick snake, often with dark, sometimes V-shaped blotches running down a black, dark or light brown, yellowish, or gray back. It has a large triangle-shaped head at one end and a black rattle-tipped tail at the other. Adults often reach nearly 5 feet (1.5 meters) in length, and some grow to more than 6 feet (1.8 meters).

Geographic range: They are found in much of the eastern United States.

Habitat: Timber rattlesnakes prefer rocky ledges on hills, although they travel into nearby forests, especially in the warmer months.



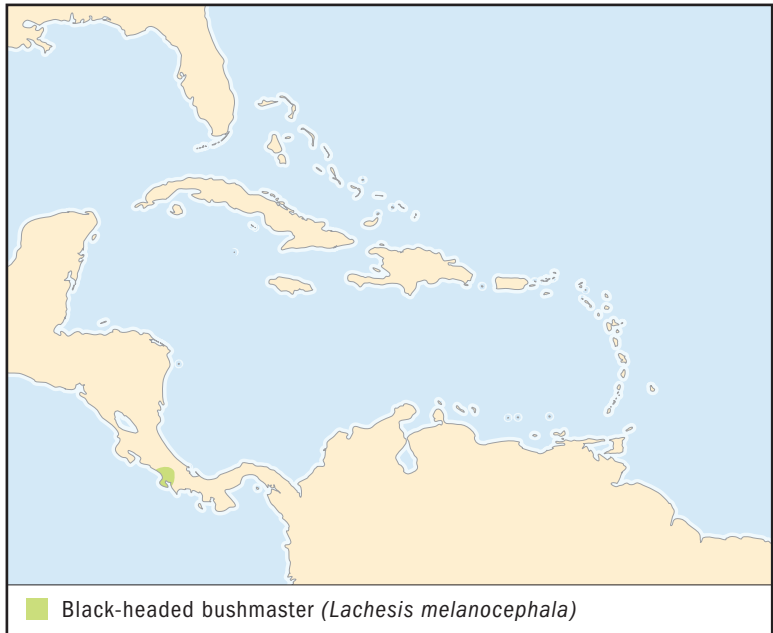
Timber rattlesnakes have only six to twenty meals a year, but when they do eat, they hunt for mammals, and sometimes birds, lizards, frogs, insects, and other snakes. (Joe McDonald/Bruce Coleman Inc. Reproduced by permission.)

Diet: They have only six to twenty meals a year, but when they do eat, they hunt for mammals, and sometimes birds, lizards, frogs, insects, and other snakes.

Behavior and reproduction: Timber rattlesnakes spend much of their time either sunbathing, also known as basking, or sitting still to wait for their next meal to wander within striking distance. In the winter, this snake hibernates either alone or in groups. Females only mate once every two, three, or four years, giving birth to between three and nineteen live baby snakes at a time. The young snakes must reach four to nine years old before they can mate and have their own young.

Timber rattlesnakes and people: Bites to humans are uncommon but can be dangerous, although rarely fatal.

Conservation status: This species is not considered endangered or threatened. ■



BLACK-HEADED BUSHMASTER

Lachesis melanocephala

Physical characteristics: As its name says, the top of the black-headed bushmaster's head is black. The back of this large snake has black diamond-shaped blotches on a dark or light brown or yellowish background. Adults often reach 6.6 feet (2 meters) in length but can grow to 7.9 feet (2.4 meters).

Geographic range: They are found in Costa Rica, possibly reaching into Panama.

Habitat: This species lives in wet or moist forests in valleys and other low places.

Diet: The black-headed bushmaster apparently eats mainly mammals.

Behavior and reproduction: A land-living snake, the black-headed bushmaster remains still much of the time, waiting for animals to wander by. If it is hungry, it will strike out and bite the passing animal. When it is not hunting, it often stays in underground tunnels

made by other animals. If threatened, it may shake its tail. This is an egg-laying species, and females lay up to sixteen eggs. Unlike many reptiles, the female remains with her eggs until they hatch.

Black-headed bushmasters and people: If they are left untreated, humans bitten by this snake may die.

Conservation status: This species is not considered endangered or threatened. ■



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Black-headed bushmaster adults often reach 6.6 feet (2 meters) in length but can grow to 7.9 feet (2.4 meters). (Illustration by Dan Erickson. Reproduced by permission.)

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family CHAPTER

AFRICAN BURROWING SNAKES

Atractaspididae

Class: Reptilia

Order: Squamata

Family: Atractaspididae

Number of species: 62 species

PHYSICAL CHARACTERISTICS

The African burrowing snakes have small heads, rounded at the front. Their heads are no larger in diameter than their necks. Only the quill-snouted snake has a head that comes to a point. The members of this family have small, sometimes very tiny, eyes with round pupils. Most have fangs, or long, pointed teeth, at the rear of the mouth, but some have hollow fangs at the front of the mouth. These front fangs swing out to inject venom, or poison, into their prey, animals that they hunt for food, or their predators (PREH-duh-ters), the animals that hunt them for food.

These small to medium-sized snakes are long and thin; adults range in length from about 12 to 40 inches (30 to 102 centimeters), from head to tail tip. Most are black or brown with a different-colored ring around the neck. A few have bright stripes. All have smooth scales, instead of the ridged scales seen in many other snakes.

GEOGRAPHIC RANGE

Most African burrowing snakes live in the central and southern regions of Africa, known as sub-Saharan Africa, but a few make their homes in Israel or in Jordan.

HABITAT

Just as their name suggests, this group of snakes likes to live in burrows, or tunnels, underground. They are especially fond of sandy soils. Some like the damp soil of lowland forests, but others can live quite well in the drier sands of grasslands and areas that are almost desertlike.

phylum

class

subclass

order

monotypic order

suborder

▲ **family**



A TAIL OF DISGUISE

Among the African burrowing snakes, the yellow and black burrowing snakes have an unusual color pattern that helps them survive. An attacking animal could end the life of one of these snakes with a well-aimed bite to its head, but the snake is able to persuade the attacker to bite its tail instead. The snake does it by curling up its body into a coil and hiding its bright yellow head inside the coil. Then it raises its tail, which is also colored yellow, and waves it back and forth. When the attacker takes a bite of the snake, all it gets is the tail. The snake can often slither off, injured but still alive.

DIET

African burrowing snakes typically eat other animals that like to live underground. Depending on the species, or type, of snake, the meals may include lizards, blind snakes, worm lizards, centipedes (sen-tuh-PEEDS), and frogs. The larger African burrowing snakes will also eat rodents, a group of animals that includes mice. Some species will eat a variety of different animals, but some are very particular. One kind of quill-snouted snake, for example, eats only large worm lizards. Although scientists are unsure how the snakes successfully attack and kill such a large animal, they suspect that this snake stabs the lizard to death with its hard and pointed head. Other picky diners are the “centipede eaters,” which rarely make a meal out of anything except the small, many-legged animals called centipedes. The snake grabs the centipede and chews it with its rear fangs to inject venom. When the venom knocks out or kills the centipede, the snake turns it around to swallow it head first.

BEHAVIOR AND REPRODUCTION

Also known as mole vipers or burrowing asps, members of this family are known best for their underground lifestyles. Some African burrowing snakes only crawl through tunnels that other animals make, but some can force their heads through loose sand and “dig” their own tunnels. Most of these snakes (except the burrowing asp) have fangs at the rear of the mouth, and so they must take a full bite to get any benefit from their fangs.

A burrowing asp, on the other hand, has two long, hollow fangs at the front of the mouth that it uses to inject venom into a prey animal or to protect itself from a predator. This unusual snake holds just one of its two backward-curving fangs outside its mouth and, keeping its mouth closed, stabs sideways and backward with its head to hook the bare fang into the prey or predator. This unusual backward-curved fang can make the snake quite dangerous to humans who mistakenly believe that they can safely hold the snake behind the head. With a quick backward flick of the head,

the snake can force its fang into a human's hand. This unique venom-delivery system has given several other common names to the burrowing asp, including side-stabbing snake and stiletto snake. A stiletto is a type of thin, sharp knife.

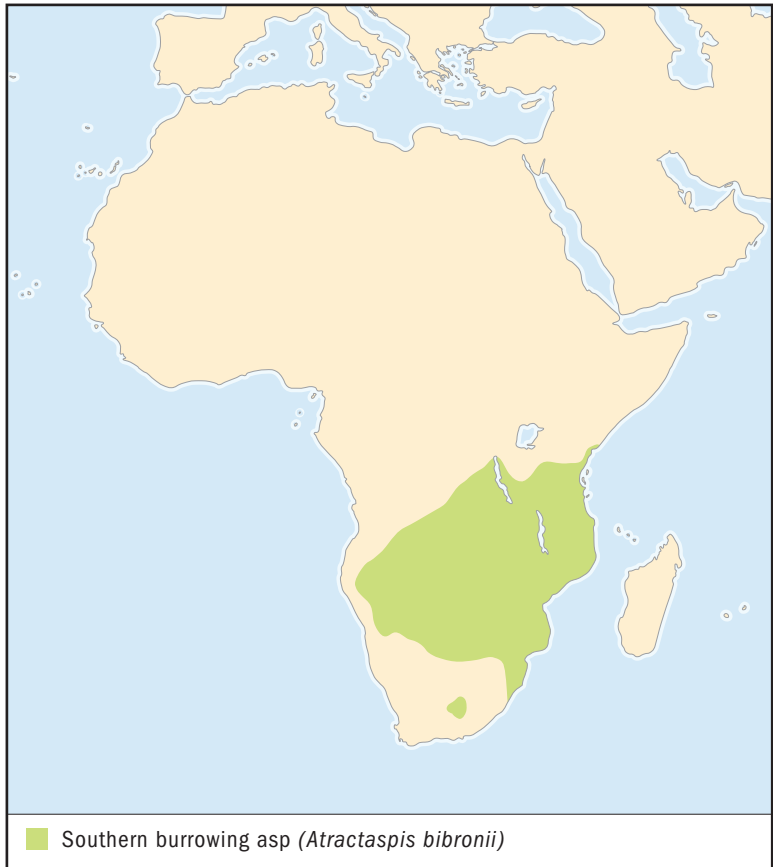
During breeding time, many species come out of their underground tunnels to find mates. The females of all except one species of African burrowing snake lay eggs. Typically, the female will lay two to fifteen oblong-shaped eggs, either in moist soil or inside an old and unused termite nest. The eggs hatch in six to eight weeks into young snakes that are about 6 to 8 inches (15 to 20 centimeters) long. The exception is the Jackson's centipede eater, which gives birth to two or three live young that are about 4 inches (10 centimeters) long.

AFRICAN BURROWING SNAKES AND PEOPLE

Most African burrowing snakes are not dangerous to humans, but some have venom powerful enough to make people sick and sometimes kill them. Bites typically occur at night, when people accidentally step on a snake or turn over in bed and roll onto a snake that has crawled under the covers. For the most part, however, African burrowing snakes are gentle animals that rarely bite humans. The burrowing asps are different. When humans even slightly bother a burrowing asp, it will strike again and again.

CONSERVATION STATUS

A few species of African burrowing snake live in very small areas, but no species is endangered or threatened.



SPECIES ACCOUNT

SOUTHERN BURROWING ASP *Atractaspis bibronii*

Physical characteristics: Also known as Bibron's burrowing asp or the side-stabbing snake, the southern burrowing asp has backward-curved fangs at the front of its mouth. This snake has a thick body, with smooth, purplish-brown to black scales down its back and, usually, a dark-gray belly. A few have dark blotches on a whitish to cream-colored belly. Females can reach 24.4 inches (62 centimeters) in length, and males can grow to about 26 inches (66 centimeters).

Geographic range: This snake is found in the southern half of Africa.

Habitat: These snakes spend much of their lives underground in savannas, flat plains covered with grass and a few trees. They also live in dry, nearly desert habitats and near the coast in thick, brushy areas.

Diet: The southern burrowing asp eats other reptiles, rodents, and frogs.

Behavior and reproduction: True to their name, these snakes can dig through the soil. Much of their digging is done to make hollow compartments under rocks. They usually remain underground, but sometimes they come to the surface at night after a rainstorm. They have an unusual smell, but scientists still are unsure if that smell has any purpose, such as attracting mates or scaring off attackers. In the summer female southern burrowing asps each lay four to eleven oblong eggs, which hatch into 6-inch-long (15-centimeter-long) young snakes.

Southern burrowing asps and people: When people and burrowing asps live in the same area, snakebites are somewhat common. A bite can lead to pain and swelling, but it will not kill humans.

Conservation status: This species is not endangered or threatened.



Southern burrowing asps usually remain underground, but sometimes they come to the surface at night after a rainstorm. (Illustration by Bruce Worden. Reproduced by permission.)

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family CHAPTER

COLUBRIDS **Colubridae**

Class: Reptilia

Order: Squamata

Family: Colubridae

Number of species: 1,700 species

PHYSICAL CHARACTERISTICS

The colubrids (KAHL-yuh-bruhds) make up the largest group of snakes; they include almost 75 percent of all the world's snake species, or types of snakes. These snakes come in many sizes, shapes, and colors. Despite the many differences among the snakes in this family, colubrids share a few features. Most have wide scales on their bellies and, usually, nine large scales on the tops of their heads. Most colubrids also have glands, or groups of cells, behind each eye. These glands squeeze out a mixture of chemicals that, in some species, oozes through enlarged back teeth, known as rear fangs. When a colubrid bites down on a prey animal, this venom, or poison, trickles into the prey animal; the venom slows down, knocks out, or kills the animal, which the colubrid then eats. Unlike the cobras and vipers, whose fast-acting venom can knock out or kill an animal in moments, the colubrids produce venom that is not as strong and usually takes many minutes to work. The boomslangs and a few other species are exceptions to the rule; they have venom powerful enough to kill humans. Antivenin (an-tee-VEH-nuhn), a remedy that neutralizes, or makes ineffective, the poison of the snake, is available to treat the bites.

Colubrid snakes range widely in size, with some species growing to about 6 inches (15.2 centimeters) and others reaching 12 feet (3.7 meters) in length. Depending on the species, males may be larger than females, or females may be larger than males.

phylum

class

subclass

order

monotypic order

suborder

▲ **family**

GEOGRAPHIC RANGE

Colubrid snakes occur almost everywhere in the world. The only places they do not live are Antarctica; the far northern reaches of Europe, Asia, and North America; and central and western Australia.

HABITAT

The snakes in this family make their homes in many different places. Some spend most of their time underground, some climb into trees and shrubs, some slither about mostly on the ground, and others live mainly in water. Most of the water-living colubrids like freshwater habitats, but a few, like the crab-eating water snake, can live in saltier water. A particularly unusual colubrid is the Southeast Asian flying snake, which not only climbs trees but also soars from one tree branch to another. These snakes do not actually fly but instead flatten out their bodies and soar from a higher branch to a lower one.

DIET

Depending on the species, colubrids may eat mammals, lizards, baby turtles, frogs and toads, fishes, earthworms, scorpions, tarantulas, some insects, and any number of other animals that will fit in their mouths. Some colubrids will eat almost anything that comes their way. Others will eat only a handful of different food items, and a few are extremely picky about their meals. For example, the rainbow snake dines on eels and little else, and the egg eaters of Africa swallow only whole bird eggs. In some species, snakes that eat one type of prey as youngsters continue eating that type of prey into adulthood. Many common garter snakes that grow up eating earthworms, for example, stick to a mostly earthworm diet as adults.

BEHAVIOR AND REPRODUCTION

Scientists have not studied the activities of most of the 1,700 colubrid species in any detail, because many of them live underground or in trees, or else they have excellent camouflage (KA-mah-flahzh), a sort of disguise, which makes them difficult to watch. Scientists do, however, have a lot of information about the more common snakes and even some particularly odd types. The most obvious features of many colubrids are their defensive methods. Often, snakes make their bodies appear bigger to scare off attacking animals, known as predators (PREH-duh-ters). For

instance, the false water cobras spread their necks into a hood, giving them the look of much larger snakes. Some colubrid snakes will open their mouths wide and might even strike and bite. Many, including the northern ribbon snake, give off bad-smelling substances to convince predators that they should leave them alone.

A wide variety of colubrid snakes find that the best way to keep away from predators is to move away as quickly as possible. Other snakes act like venomous (VEH-nuh-mus), or poisonous, species, or they have coloring that copycats the coloring of venomous species. For example, the scarlet kingsnake has no dangerous venom, but it looks very much like the venomous eastern coral snake, and the milk snake, that has no dangerous venom, will wiggle its tail just as a venomous rattlesnake does.

Many colubrids that live in cool climates, particularly those with very cold winters, will hibernate (HIGH-bur-nayt), or become inactive and sleep deeply, to help them survive the frigid (FRIH-juh-d) weather. Although most snakes do not dig, they will use other animals' underground homes as places to hibernate. Snakes will also sometimes hibernate among tree roots; inside old, rotting tree stumps; or in any other protected spot they can find.

During mating season, which usually happens once a year, the males of many colubrid species will wrestle with one another. In these fights two snakes usually twist their bodies around each other while trying to tip over the opponent. The winner approaches the female to mate. In some species, the male flicks his tongue at the female and presses his head against the female's back before mating. Tongue flicking is also used in hunting. Snakes do not really have a sense of smell. When a snake flicks out its tongue, it picks up scent (SENT) chemicals from the air. The snake then presses its tongue against the roof of its mouth and "smells" the scent, or odor, in that way.

Most colubrid snakes lay eggs, but some females give birth to live snakes. Typically, the females lay eggs in a hole or tunnel in the ground or under some rotting leaves. The smaller



A SNAKE MELTING POT

When considering all of the snakes in the world, nearly three of every four species is a member of the family Colubridae. Scientists have been struggling for many years to decide for sure if all of these snakes should remain in one large family or be split up into several smaller families. For now, however, they are all in one large family that is divided into smaller groups, called subfamilies. Not everyone agrees on the arrangement of the snakes in these subfamilies or even on the number of subfamilies, however, so plenty of work is left to do.

species have fewer young than the larger species. Some of the smallest colubrids, such as the worm snakes, may lay only three eggs at a time, while larger species, like mud snakes, may lay more than thirty eggs. The diamond-backed water snake gives birth to nearly fifty live young at a time. For some species, the female's duties are complete as soon as she gives birth, but for others, the female will stay near her nest and protect her eggs.

COLUBRIDS AND PEOPLE

Humans are much more dangerous to colubrids than colubrids are to humans. People collect the snakes for pets or for food and, occasionally, for their skins, which are made into leather. For their part, most colubrids are of no danger to humans. Even those species with large or grooved rear teeth that can inject humans with mild venom typically do little more harm with their bites than to cause a bit of swelling at the bite spot. A few unusual species, including the boomslangs and twig snakes of Africa, have venom powerful enough to kill humans.

CONSERVATION STATUS

The World Conservation Union (IUCN) lists one species as Extinct, meaning that none is still alive. Six species are Critically Endangered, meaning that they face an extremely high risk of extinction in the wild, and seven are Endangered, meaning that they face a very high risk of extinction. Eight are considered Vulnerable, meaning that their risk of extinction is high, and four are Near Threatened, meaning that they may face the risk of becoming threatened with extinction in the near future. The U.S. Fish and Wildlife Service lists seven U.S. species and one foreign colubrid as Threatened.

The danger to most colubrid populations comes from the destruction of their habitat, or their preferred living areas, and their collection for the pet trade, food, or leather. While many species are finding it hard to survive, the brown tree snake is doing very well. This slender snake grows to 4.5 to 6.5 feet (1.4 to 2 meters) in length. It is native to Indonesia, New Guinea, Australia, and the Solomon Islands, but it seems to have hitched a ride on military ships during World War II to the Pacific island of Guam. Once there, it quickly adapted to its new home and has since hunted and eaten to extinction several species of the island's native birds and lizards.



BOOMSLANG

Dispholidus typus

SPECIES ACCOUNTS

Physical characteristics: A long, thin snake, the boomslang comes in a number of colors, including green, reddish, and black with yellow spots inside each of the black scales. The belly is often a creamy color. The boomslang has a large head and big eyes. Adults are about 4 feet (1.2 meters) long.

Geographic range: The boomslang lives in the central and southern regions of Africa, which is known as sub-Saharan Africa.

Habitat: This snake spends most of its time crawling among the branches of trees and shrubs in forests and grasslands.

Boomslangs spend most of their time crawling among the branches of trees and shrubs in forests and grasslands. (Bill Ruth/Bruce Coleman Inc. Reproduced by permission.)

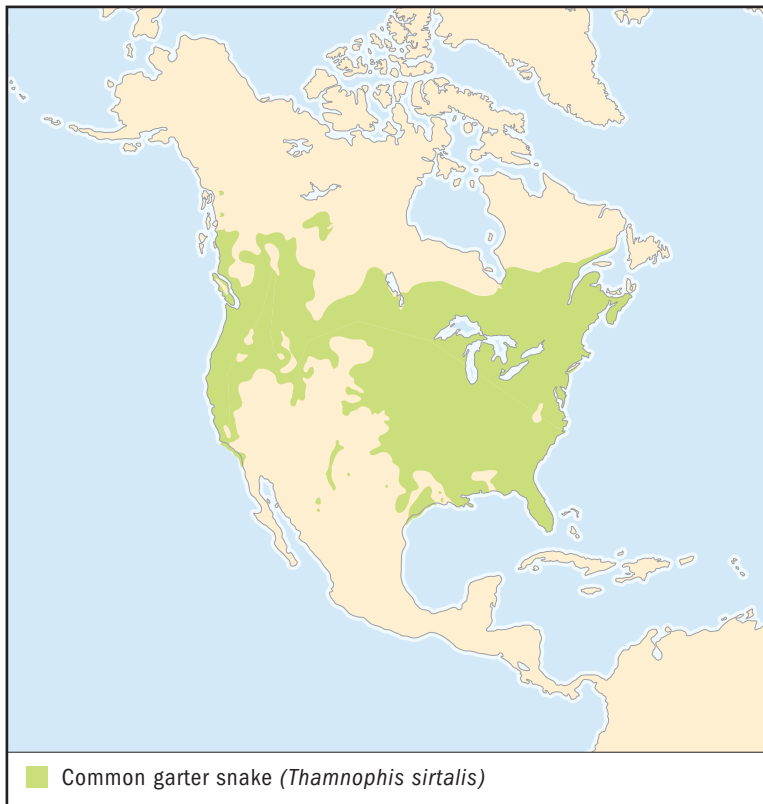


Diet: It feeds on a variety of animals that it finds in trees and shrubs, including birds and chameleons (kuh-MEEL-yuns), a type of lizard.

Behavior and reproduction: Active during the day, the boomslang hunts for food above the ground in trees and shrubs. This snake, which has rear fangs, will bite and inject venom into prey and into attacking animals. The boomslang is an egg-laying species, and females lay about twelve eggs at a time.

Boomslangs and people: If the boomslang feels threatened, it may bite a person and inject its venom. The venom can be deadly to humans.

Conservation status: This species is not endangered or threatened.



COMMON GARTER SNAKE

Thamnophis sirtalis

Physical characteristics: The common garter is a somewhat thin snake that may be brown, greenish, or red and may have blackish blotches. Garters usually have three long stripes running from top to bottom: a center stripe that may be almost cream in color and two yellow stripes along the sides of the body. Adults range from about 20 to 28 inches (51 to 71 centimeters) in length, but some can reach more than 4 feet (1.2 meters). Females and males look alike, but females are typically a bit larger than males and have shorter tails. Males' tails make up about 25 percent of the snake's overall length, while female tails make up about 20 percent.

Geographic range: This snake lives in Canada, the United States, and Mexico. Some populations live as far south as Florida and northern



Common gartersnakes eat a variety of animals, including insects, frogs, and small fishes, birds, and mammals. (Illustration by Barbara Duperron. Reproduced by permission.)

Mexico, while others live as far north as Canada and into the southern part of the Northwest Territories.

Habitat: Garters thrive in many habitats, including marshy spots, fields, and forests, especially near water. They also will enter freshwater areas for short periods of time.

Diet: Active during the day, garters eat a variety of animals, including insects, frogs, and small fishes, birds, and mammals.

Behavior and reproduction: Common garters that live in warm southern climates are active all year long. Those that live in the north hibernate during the coldest months. Hibernating males become active a bit earlier in the spring than the females, and mating occurs almost as soon as the females awaken. Females give birth to about ten to fifteen live young.

Common garter snakes and people: Most people know the garter as the snake seen in a garden. In fact, some people call it a “garden snake,” and unfortunately many kill these harmless animals. These snakes may also die from encounters with cats and dogs, cars, and lawn mowers. Garters are common pets.

Conservation status: The IUCN does not consider this snake species to be threatened. The U.S. Fish and Wildlife Service lists one subspecies, called the San Francisco garter snake, as Endangered. The danger for this subspecies comes from loss of its habitat. A subspecies is a small group within a species that typically lives in a particular area and usually has a slightly different look from the rest of the animals in the species. ■



MILK SNAKE

Lampropeltis triangulum

Physical characteristics: Although all milksnakes have smooth, shiny scales, they can look quite different from one region to the next. Some have large red or brown blotches that are often lined in black on a gray to tan background; others have bands of red, black, and yellow or white. A few are solid black. Adults range from 20 to 60 inches (51 to 152 centimeters) in length.



Although the milksnake is not dangerous, people often kill it because it defends itself by shaking its tail, striking, and biting, the type of behavior that can make people think that it is a dangerous rattlesnake. (Illustration by Barbara Duperron. Reproduced by permission.)

Geographic range: The milksnake lives in North America, Central America, and South America. They make their homes throughout much of the New World, from southeastern Canada through all but the far western United States, into Mexico, Central America, and south to Ecuador and northern Venezuela.

Habitat: Milksnakes are common in forests and fields and sometimes live on rocky hillsides.

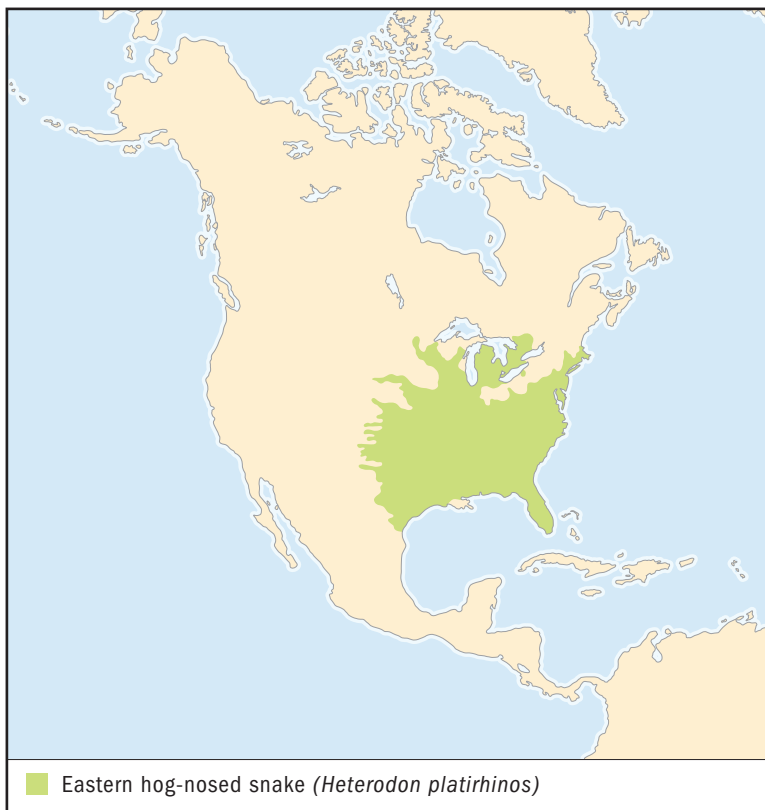
Diet: Young snakes seem to prefer eating other snakes, but adults round out their diet with small mammals, lizards, and bird and reptile eggs. A

milksnake typically kills mammals and lizards by constriction (kun-STRIK-shun), which means that it coils its body around the prey animal and squeezes it to death.

Behavior and reproduction: The milksnake is a secretive animal during the day and usually stays under the bark of a tree, beneath boards, or in other small hiding places. It becomes active at night, when it feeds. Cold-climate milksnakes hibernate during the winter, often in groups. They mate in the spring. Females lay about ten eggs at a time, and the eggs hatch in one and a half to two months. When they reach three to four years of age, the young snakes are old enough to reproduce, or have their own young.

Milkshakes and people: Although the milksnake is not dangerous, people often kill it because it defends itself by shaking its tail, striking, and biting, the type of behavior that can make people think that it is a dangerous rattlesnake. Because the snake is sometimes found in barns, people at one time had the mistaken idea that it milked cows, and so they named it the milksnake. It is sometimes collected for the pet trade.

Conservation status: The milksnake is not endangered or threatened. ■



EASTERN HOG-NOSED SNAKE

Heterodon platirhinos

Physical characteristics: The eastern hog-nosed snake has a thick body and a wide head with an upward-curving snout, or nose area. Its scales form ridges, or raised areas, and the snake's back usually is covered with brown spots scattered over a yellowish, orangey, gray, or olive green background. The spots, however, may be faded or missing entirely. Occasionally, a snake may be completely black. Adults are typically about 30 inches (76 centimeters) long, but they can grow to more than 45 inches (114 centimeters).

Geographic range: The eastern hog-nosed snake is found in Canada and the United States. It lives throughout most of the eastern half of the United States and into southern Ontario, Canada.



Some people call this snake a hissing adder, puff adder, or spread adder, because it spreads out its neck as a cobra does and makes loud hissing noises when threatened. (Illustration by Barbara Duperron. Reproduced by permission.)

Habitat: This snake likes drier areas, including fields and forests.

Diet: Eastern hog-nosed snakes eat mainly toads, but they will also sometimes eat frogs, salamanders, and small mammals. Toads will often puff up their bodies with air to protect themselves from attackers, but hog-nosed snakes have long rear fangs that puncture and help deflate the toads in much the same way that a pin lets the air out of a balloon.

Behavior and reproduction: Some people call this snake a hissing adder, puff adder, or spread adder, because it spreads out its neck as a cobra

does and makes loud hissing noises when threatened. If these defense moves fail, the snake may strike at the attacker, but almost always with its mouth closed. It does not actually bite. If necessary, the snake may follow up by vomiting, smearing its own waste over its body, or going into a squirming fit. As a last resort, it will roll onto its back, open its mouth with its tongue dragging, and play dead. If the attacker turns the snake onto its belly, it will promptly roll onto its back again as if it can play dead only when it is upside down. Once the attacker leaves, the snake turns over and scoots away.

This is an egg-laying snake. Females usually lay about twenty eggs at a time, although some lay up to sixty.

Eastern hog-nosed snakes and people: People frequently mistake this harmless snake for a venomous snake and kill it.

Conservation status: The eastern hog-nosed snake is not endangered or threatened. ■



INDIGO SNAKE

Drymarchon corais

Physical characteristics: The indigo snakes that live in the southeastern United States are shiny black or bluish-black with a reddish throat. In tropical areas, their colors range from black to brown, gray, or yellow. Sometimes, the tail is a different color from the rest of the body. The longest snake in the United States, adults can reach nearly 10 feet (3 meters) long.

Although it lives mainly on land, the indigo snake often prefers areas near a water source.
(©Joseph T. Collins/Photo Researchers, Inc. Reproduced by permission.)



Geographic range: This snake lives from the southeastern United States south to northern Argentina in South America.

Habitat: Although it lives mainly on land, this snake often prefers areas near a water source, and it will dip into the water to chase prey. In the United States it tends to live in grasslands and shrubby spots with sandy soil, but it also may make its home in moist forests.

Diet: The indigo snake eats a variety of animals, including fishes and frogs, turtles, birds, mammals, and other snakes, including pit vipers.

Behavior and reproduction: Active during the day, this large snake spends much of its time searching for prey, which it bites at and swallows using its strength and size. Females lay about four to twelve eggs at a time. When the eggs hatch, the young snakes may be 2 feet (61 centimeters) long or more.

Indigo snakes and people: People often collect this usually gentle snake for the pet trade.

Conservation status: Although the IUCN does not consider the indigo snake to be threatened, the U.S. Fish and Wildlife Service lists it as Threatened in the United States. This large snake is popular in the pet trade. Its habitat is shrinking as people build in these areas. ■

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COBRAS, KRAITS, SEA SNAKES, AND RELATIVES

Elapidae

Class: Reptilia

Order: Squamata

Family: Elapidae

Number of species: More than 300
species

family

CHAPTER

phylum

class

subclass

order

monotypic order

suborder

▲ family

PHYSICAL CHARACTERISTICS

The cobras, kraits (KRYTS), sea snakes, death adders, and other members of this family are venomous (VEH-nuh-mus), or poisonous, snakes that vary in length from just 7 inches (17.8 centimeters) to 16 feet, 8 inches (5 meters). Despite their many differences, all of the snakes in this family, known as elapids (EH-luh-puds), are alike in some ways. They each have two “fixed” fangs, or long, pointed teeth that cannot move, at the front of the mouth. These short fangs are always pointed downward and ready to inject venom. Elapids are mostly thin snakes with heads that are about the same size around as their necks and with large scoots, or scales, down the back. Many cobras are well known for their ability to spread out their necks into a sort of hood.

Some elapids are brightly colored; others are not. Some have stripes, but others are just one color. Still others have side-to-side bands of color. The coral snakes, for example, often have bright bands of different colors.

GEOGRAPHIC RANGE

The elapids live in Africa, Asia, Australia, the United States and Mexico, Central America, South America, and the Pacific and Indian Oceans.

HABITAT

This large family has species that can live in almost any habitat, from deserts and dry grasslands to rainforests and even

oceans. Most of the three hundred species, or types of snakes, in this family live on the ground, but some elapids spend at least part of their time underground, and others live nearly their entire lives in trees or underwater. Some scientists split this family into two: the Elapidae encompassing all of the land-living species and a second family, known as the Hydrophiidae, containing the snakes that live in water.

DIET

Elapids eat small mammals, birds, snakes, lizards, frogs, and fishes. Many of them feed on whatever they can find, while others eat only one or two different items. The favorite food of the southern African Rinkhal's cobra, for instance, is toads. Sea snakes find their meals in the coral reefs where most of them live, and they eat mainly fishes, eels, or squids. Most species in this family actively hunt for food, slithering or swimming up to prey, an animal they intend to eat, and then striking at them and biting them with their fangs. The fangs release venom, or poison, which slows down the prey's heartbeat and breathing, making the animal easy to eat. Rather than finding prey, the Australian death adder lets prey come to it. The adder sits still, wriggling only the tip of its tail, which looks much like an insect grub, the very young form of an insect. As the animals come closer to take a bite out of the tasty "grub," the snake strikes.

BEHAVIOR AND REPRODUCTION

One of the most common myths about elapids is that they can be "charmed," or controlled through playing music. Film clips show snake charmers playing the flute and cobras rising from their baskets because they have been "hypnotized," or put into a trance, by the music. Actually, cobras cannot even hear music. Like all elapids, they can hear low sounds, like the vibrations (vie-BRAY-shuns) made by a person stomping on the ground, but they cannot hear musical notes, which are much



SNAKE COPYCATS

Nature is filled with copycat animals, and snakes are no exception. The coral snake is one example. These snakes have powerful venom and, with one bite, can sicken and often kill attacking animals. They also have bold red, black, and yellow bands, and predators learn to avoid snakes with those patterns. There are other snakes that live among the coral snakes but lack their venom. Many of them are colored very much like the coral snakes. While these "copycats" pose little danger to other animals, predators avoid them because they look so much like coral snakes. These copycats, known as mimics (MIM-iks), can be quite common. In coral snake habitats, for instance, these mimic species are so common that they actually outnumber true coral snakes by two to one.

higher sounds. The cobra sways back and forth not because it is listening to the musical beat but because it is following the movements of the snake charmer, who is swaying to the music.

Depending on the species, an elapid may be active at sunset and at night or during the daytime. Snakes that live in warm climates stay active all year, but those that live in colder areas, hibernate (HIGH-bur-nayt), or remain inactive, in the winter. During hibernation (high-bur-NAY-shun), the snakes enter a state of deep sleep that helps them survive the cold weather.

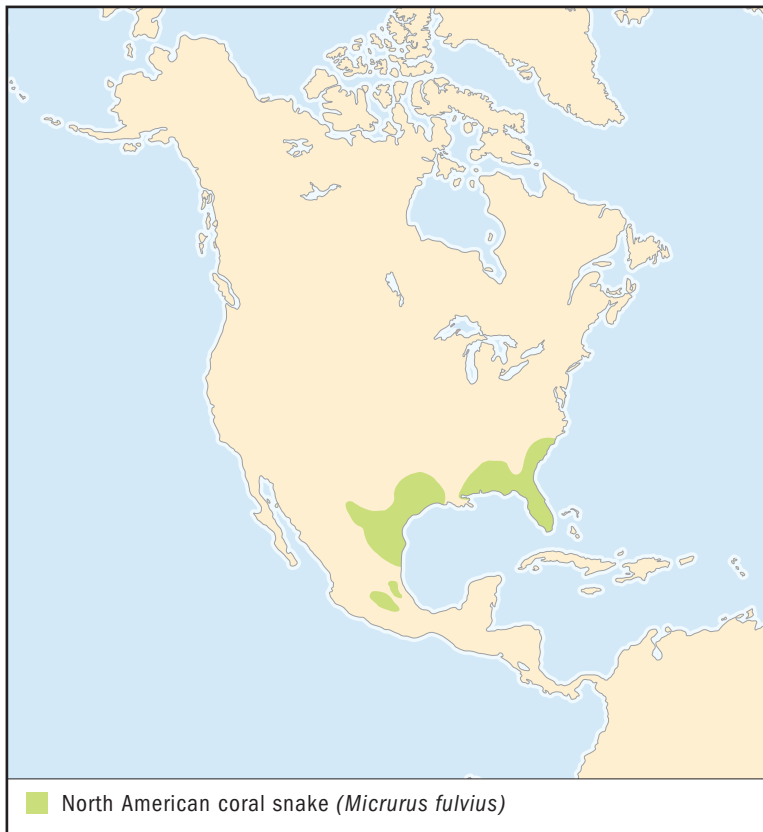
Most elapids reproduce in the spring. In general, males fight with one another, and the winners mate with the females. Many elapids lay eggs, but others give birth to live young snakes. The egg-laying females usually place their eggs under a rock or a log or in some other hiding place. The eggs hatch in about three months. The females that give birth to live young do so in a hiding place. Scientists believe that the king cobras are the only elapids that provide any care for eggs or young. These snakes remain with their eggs and will strike out at anything or anyone who approaches too closely.

COBRAS, KRAITS, SEA SNAKES, THEIR RELATIVES, AND PEOPLE

More than half of the venomous snake species in the world belong to this family, which includes cobras, mambas, coral snakes, land-living kraits, brown snakes, taipans (TY-pans), death adders, sea kraits, and sea snakes. Some of them are quite deadly to humans. Nonetheless, snake charmers and other people annoy the snakes for entertainment or collect them for their skins, which are used for belt and shoe leather.

CONSERVATION STATUS

The World Conservation Union (IUCN) lists seven species as Vulnerable, which means that they face a high risk of extinction in the wild. Two species are Near Threatened, which means they are at risk of being threatened with extinction in the future. Causes for the declines in their numbers may include loss of their habitats, or preferred living areas, and collecting of snakeskins for leather.



NORTH AMERICAN CORAL SNAKE

Micrurus fulvius

SPECIES ACCOUNTS

Physical characteristics: This thin snake has a repeated color pattern of narrow yellow, wide red, and wide black bands. A narrow yellow band separates the black and red bands. Adults normally are 18 to 28 inches (45.7 to 71 centimeters) long, but they have been known to grow to more than 4 feet (1.2 meters).

Geographic range: North American coral snakes live in the United States and Mexico.

Habitat: The North American coral snake lives in many areas, including deserts and forests and even along the shorelines of lakes and ponds.

North American coral snakes often hide under leaves or logs or in some other shelter.
(Illustration by Dan Erickson.
Reproduced by permission.)

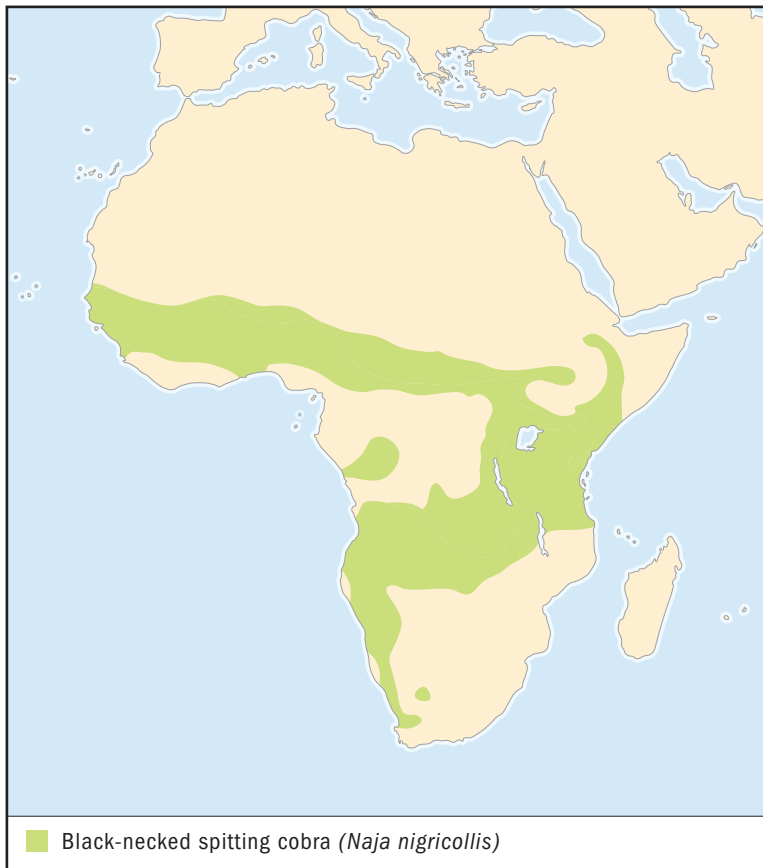


Diet: This snake eats mostly small lizards but sometimes also dines on frogs and other snakes. It tracks the lizards and snakes by following their scents (SENTS), or smells.

Behavior and reproduction: These secretive snakes often hide under leaves or logs or in some other shelter. When a coral snake feels threatened, it sometimes pokes out the end of its tail, which may confuse the attacker into thinking the tail is the head. This can give the coral snake time to get away. Females usually lay fewer than nine eggs at a time, but they can lay as many as thirteen. Little else is known about them.

North American coral snakes and people: The coral snake's venom is strong enough to kill a human, but antivenin (an-tee-VEH-nuhn) is available. Antivenin is a substance that neutralizes a snake's venom, meaning that it causes the venom to have no bad effect.

Conservation status: These snakes are not endangered or threatened. ■



BLACK-NECKED SPITTING COBRA

Naja nigricollis

Physical characteristics: The black-necked spitting cobra may be solid black or brown, or it may be striped with black and white. It has two sharp, thin fangs that it uses to spray its venom. These snakes can reach a length of 79 inches (2 meters).

Geographic range: This snake lives in western, central, and southern Africa.

Habitat: The black-necked spitting cobra usually lives in grasslands, but it sometimes enters villages and cities, where it can cause quite an uproar among human residents, who worry about being poisoned with its venom.

Although it spends much of its time on the ground, the black-necked spitting cobra can easily climb into bushes and trees. (Illustration by Dan Erickson. Reproduced by permission.)



Diet: The black-necked spitting cobra eats almost anything it finds, including frogs and toads, birds and their eggs, and other reptiles.

Behavior and reproduction: Although it spends much of its time on the ground, this cobra can easily climb into bushes and trees. It is most active at night, but it sometimes moves about during the day. Females lay eight to twenty eggs at a time.

Black-necked spitting cobras and people: Local people fear this snake, which can spray venom almost 10 feet (3 meters). The snake aims for the eyes, and the venom can be very painful and can even cause blindness if the person is not treated immediately. A bite from the snake can kill a person.

Conservation status: The black-necked spitting cobra is not endangered or threatened. ■



KING COBRA

Ophiophagus hannah

Physical characteristics: The king cobras are snakes of many colors; they may be black, brown, brownish-green, or yellow. These large snakes usually reach about 9.8 feet (3 meters) in length, but they can grow to 16.4 feet (5 meters).

Geographic range: The king cobra lives from India through South-east Asia (the Philippines and into Indonesia).

Habitat: King cobras are animals of the thick jungle and usually prefer to live near water.

Diet: Their main food items are other snakes, including other venomous species.

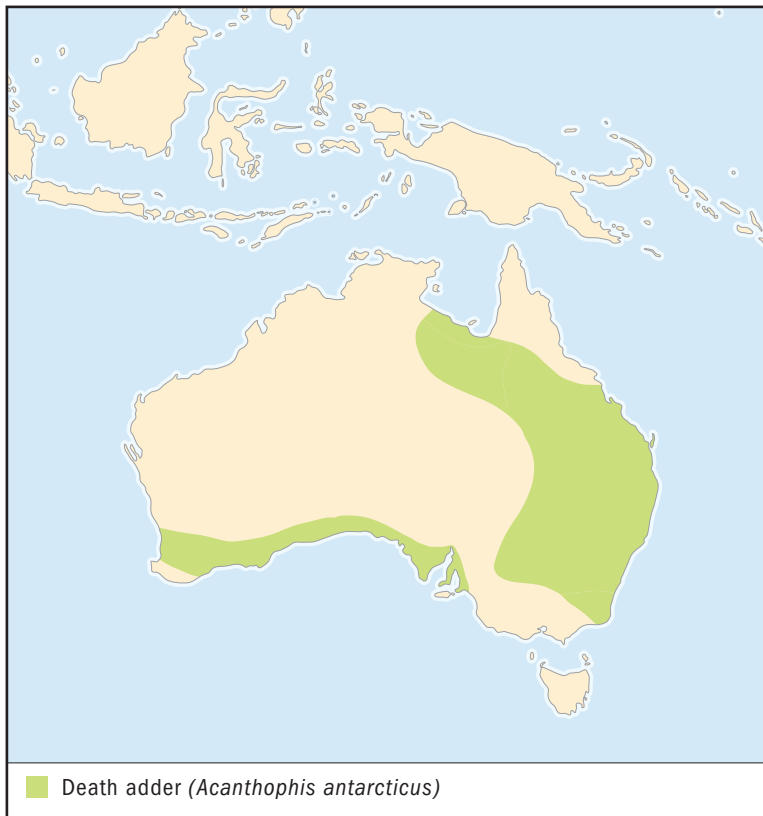
King cobras are snakes of many colors; they may be black, brown, brownish-green, or yellow. (Joe McDonald/Bruce Coleman Inc. Reproduced by permission.)



Behavior and reproduction: Unlike most other members of this family, male and female king cobras will form pairs, make a nest from leaves and dirt in a growth of bamboo, and protect the nest and, later, the eggs from attackers. Once the eggs hatch, the parents leave the nest site, and the young must live on their own immediately.

King cobras and people: When a king cobra bites a person, it can inject a dose of venom that can kill.

Conservation status: The king cobra is not endangered or threatened. ■



DEATH ADDER *Acanthophis antarcticus*

Physical characteristics: The death adder has a thick body, with bands of light brown to black. Adults are about 20 to 39 inches (0.5 to 1 meter) long.

Geographic range: The death adder is found in Australia.

Habitat: Death adders live in dry areas, including grasslands and deserts, in eastern and southern Australia. It also sometimes wanders into cities.

Diet: The death adder eats mainly small reptiles but also frogs and small mammals.

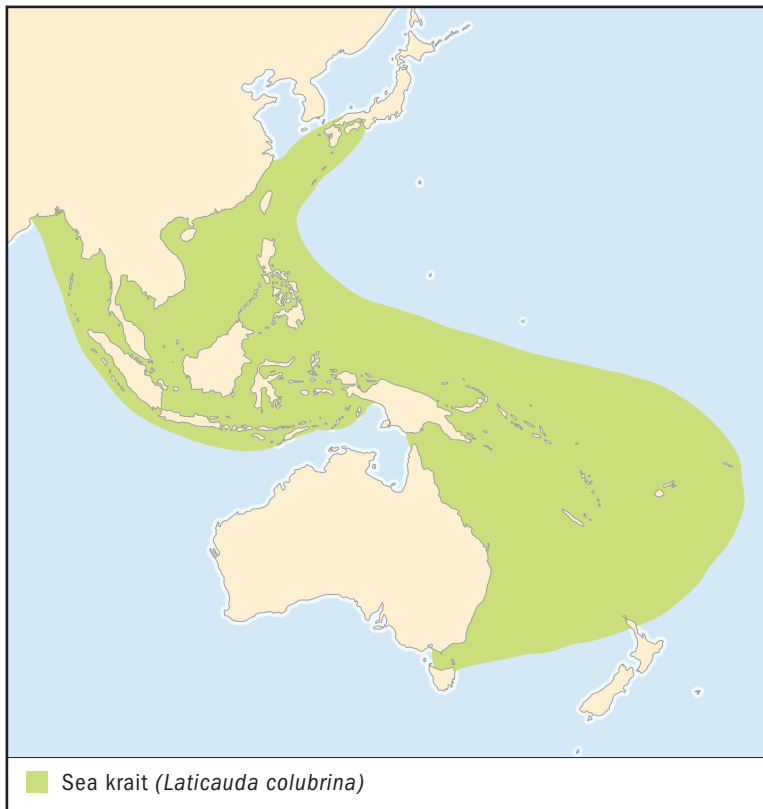
The death adder eats mainly small reptiles but also frogs and small mammals. (Frith Photo/Bruce Coleman Inc. Reproduced by permission.)



Behavior and reproduction: Most members of this family actively search out prey to eat, but the death adder buries itself, leaving out just the tip of its tail. The tail tip, which looks like a worm, catches the attention of their prey. When the prey animals get close, the adder strikes. The death adder is a secretive snake and is most active at night. Females give birth to live snakes, instead of laying eggs; they may have up to twenty young at a time.

Death adders and people: The snake's venom is very strong and can kill people. Antivenin is available.

Conservation status: The death adder is not endangered or threatened. ■



SEA KRAIT

Laticauda colubrina

Physical characteristics: The sea krait is banded with blue or bluish gray and black and has a paddle-shaped tail to help it swim. It also has valves, or flaps, that can close its nostrils, or nose holes, when it goes underwater. Adults are usually about 39 inches (1 meter) long, but some sea kraits can reach 55 inches (1.4 meters) in length.

Geographic range: The sea krait is found in New Guinea, on many Pacific islands, and from India to Southeast Asia.

Habitat: Sea kraits spend most of their lives in the ocean water, coming ashore only to rest or to lay their eggs. Once in a while, they may travel into mangrove swamps. Mangroves are tropical trees and shrubs that form thick masses along coastlines.

Sea kraits spend most of their lives in the ocean water, coming ashore only to rest or to lay their eggs. (Illustration by Dan Erickson. Reproduced by permission.)



Diet: They usually find their food, primarily eels, in coral reefs.

Behavior and reproduction: Most active at night, the sea krait occasionally looks for food in the daytime. In the breeding season, females leave their saltwater homes to lay up to eighteen eggs at a time on the seashore.

Sea kraits and people: People are rarely bitten by this gentle snake. A sea krait's bite, however, is venomous.

Conservation status: The sea krait is not endangered or threatened.

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Species List by Biome

CONIFEROUS FOREST

Blind lizard
Boomslang
Common chameleon
Common garter snake
Eastern box turtle
Eastern hog-nosed snake
Florida wormlizard
Flying lizard
Frisled lizard
Green anole
Green python
House gecko
Indigo snake
Milkshake
Neotropical sunbeam snake
North American coral snake
Reticulated python
Texas blind snake
Timber rattlesnake

CONTINENTAL MARGIN

Green seaturtle
Loggerhead turtle

DECIDUOUS FOREST

Agamodon anguliceps
Armored chameleon
Black-headed python

Blackish blind snake
Blind lizard
Boa constrictor
Boomslang
Broad-headed skink
Common chameleon
Common garter snake
Common sunbeam snake
Crocodile tegu
Eastern box turtle
Eastern hog-nosed snake
Florida wormlizard
Flying lizard
Galápagos tortoise
Gila monster
Green python
Indigo snake
Knob-scaled lizard
Komodo dragon
Lesser blind snake
Milkshake
Neotropical sunbeam snake
North American coral snake
Northern Tuatara
Prehensile-tailed skink
Red-tailed pipe snake
Reticulated python
Sand lizard
Southern bromeliad
woodsnake

Texas alligator lizard
Texas blind snake
Timber rattlesnake
Yellow-margined box turtle

DESERT

Agamodon anguliceps
Boa constrictor
Cape flat lizard
Cape spiny-tailed iguana
Common chameleon
Common chuckwalla
Death adder
Desert night lizard
Desert tortoise
Gila monster
Horned viper
House gecko
Jackson's chameleon
North American coral snake
Sandfish
Southern burrowing asp
Spiny agama
Texas alligator lizard
Texas blind snake
Western banded gecko

GRASSLAND

Bachia bresslaui

Black-headed python
 Blackish blind snake
 Black-necked spitting cobra
 Boa constrictor
 Boomslang
 Common garter snake
 Common sunbeam snake
 Death adder
 Desert tortoise
 Eastern box turtle
 Eastern hog-nosed snake
 Galápagos tortoise
 Gila monster
 Indigo snake
 Komodo dragon
 Lesser blind snake
 Milksnake
 Nilgiri burrowing snake
 Sand lizard
 Six-lined racerunner
 Southern burrowing asp
 Texas alligator lizard
 Texas blind snake
 Two-legged wormlizard
 Western banded gecko

LAKE AND POND

American alligator
 American crocodile
 Central American river turtle
 Common caiman
 Common garter snake
 Cottonmouth
 False coral snake
 Green anaconda
 Helmeted turtle
 Little file snake
 Matamata
 Nile crocodile
 North American coral snake
 Painted turtle
 Pig-nose turtle
 Reticulated python

Snapping turtle
 Spiny softshell
 Stinkpot
 Yellow-margined box turtle

OCEAN

Green seaturtle
 Leatherback seaturtle
 Little file snake
 Loggerhead turtle
 Sea krait

RAINFOREST

Black-headed bushmaster
 Black-headed python
 Blind lizard
 Boa constrictor
 Crocodile monitor
 Emerald tree boa
 False coral snake
 Flying lizard
 Green python
 House gecko
 Jackson's chameleon
 King cobra
 Lesser blind snake
 Neotropical sunbeam snake
 Southern bromeliad
 woodsnae
 Splitjaw snakes
 White-bellied wormlizard
 Yellow-margined box turtle

RIVER AND STREAM

American alligator
 American crocodile
 Big-headed turtle
 Central American river turtle
 Common caiman
 Common garter snake
 Cottonmouth
 Crocodile tegu

False coral snake
 Gharial
 Green anaconda
 Helmeted turtle
 Little file snake
 Matamata
 Nile crocodile
 Painted turtle
 Pig-nose turtle
 Reticulated python
 Snapping turtle
 South American river turtle
 Spiny softshell
 Stinkpot
 Yellow-margined box turtle

SEASHORE

Green seaturtle
 Loggerhead turtle
 Sea krait

UNKNOWN

False blind snake

WETLAND

American alligator
 American crocodile
 Broad-headed skink
 Common caiman
 Common garter snake
 Cottonmouth
 Green anaconda
 Helmeted turtle
 Komodo dragon
 Little file snake
 Nile crocodile
 Pig-nose turtle
 Red-tailed pipe snake
 Reticulated python
 Sea krait
 Snapping turtle

Species List by Geographic Range



AFGHANISTAN

Gharial

ALGERIA

Common chameleon
Horned viper
Sandfish

ANGOLA

Black-necked spitting cobra
Boomslang
Helmeted turtle
Nile crocodile
Southern burrowing asp

ARCTIC OCEAN

Leatherback seaturtle

ARMENIA

White-bellied wormlizard

ATLANTIC OCEAN

Green seaturtle
Leatherback seaturtle
Loggerhead turtle

AUSTRALIA

Black-headed python
Blackish blind snake

Death adder
Fringed lizard
Green python
House gecko
Little file snake
Pig-nose turtle

AUSTRIA

Sand lizard

BANGLADESH

House gecko
King cobra
Little file snake
Reticulated python

BELARUS

Sand lizard

BELGIUM

Sand lizard

BELIZE

American crocodile
Boa constrictor
Central American river turtle
Common caiman
Indigo snake

Milksnake
Snapping turtle

BENIN

Boomslang
Helmeted turtle
Nile crocodile

BHUTAN

Gharial
Reticulated python

BOLIVIA

Boa constrictor
False coral snake
South American river turtle
White-bellied wormlizard

BOTSWANA

Boomslang
Helmeted turtle
Spiny agama

BRAZIL

Bachia bresslaui
Boa constrictor
Common caiman
Crocodile tegu

Early blind snake
Emerald tree boa
False coral snake
Green anaconda
Indigo snake
Matamata
South American river turtle
White-bellied wormlizard

BRUNEI

House gecko
King cobra
Little file snake
Red-tailed pipesnake
Reticulated python

BULGARIA

Sand lizard

BURKINA FASO

Black-necked spitting cobra
Boomslang
Helmeted turtle
Nile crocodile

BURUNDI

Black-necked spitting cobra
Boomslang
Helmeted turtle
Nile crocodile

CAMBODIA

Common sunbeam snake
House gecko
King cobra
Little file snake
Red-tailed pipesnake
Reticulated python

CAMEROON

Black-necked spitting cobra
Boomslang
Helmeted turtle
Nile crocodile

CANADA

Common garter snake
Eastern hog-nosed snake
Milksnake
Painted turtle
Snapping turtle
Spiny softshell
Stinkpot
Timber rattlesnake

CENTRAL AFRICAN REPUBLIC

Black-necked spitting cobra
Boomslang
Nile crocodile

CHAD

Boomslang
Sandfish

CHINA

Big-headed turtle
Common sunbeam snake
King cobra
Red-tailed pipesnake
Sand lizard
Yellow-margined box turtle

COLOMBIA

American crocodile
Boa constrictor
Common caiman
Crocodile tegu
Emerald tree boa
False coral snake
Green anaconda
Indigo snake
Matamata
Milksnake
Snapping turtle
South American river turtle
Southern bromeliad
woodsnake
White-bellied wormlizard

COMOROS

Helmeted turtle

COSTA RICA

American crocodile
Black-headed bushmaster
Common caiman
Indigo snake
Milksnake
Neotropical sunbeam snake
Snapping turtle
Southern bromeliad woodsnake

CUBA

American crocodile
Milksnake
White-bellied wormlizard

CYPRUS

Common chameleon

CZECH REPUBLIC

Sand lizard

DEMOCRATIC REPUBLIC OF THE CONGO

Black-necked spitting cobra
Boomslang
Helmeted turtle
Nile crocodile
Southern burrowing asp

DENMARK

Sand lizard

DJIBOUTI

Boomslang
Helmeted turtle
Horned viper

DOMINICAN REPUBLIC

American crocodile
Milksnake
White-bellied wormlizard

ECUADOR

American crocodile
Common caiman
False coral snake
Galápagos tortoise
Matamata
Milksnake
Snapping turtle

EGYPT

Common chameleon
Horned viper
Sandfish

EL SALVADOR

American crocodile
Boa constrictor
Common caiman
Indigo snake
Milksnake
Neotropical sunbeam snake

EQUATORIAL GUINEA

Boomslang
Helmeted turtle
Nile crocodile

ERITREA

Boomslang
Helmeted turtle
Horned viper
Nile crocodile

ESTONIA

Sand lizard

ETHIOPIA

Agamodon anguliceps
Black-necked spitting cobra
Boomslang
Helmeted turtle
Nile crocodile

FIJI

House gecko

FRANCE

Sand lizard

FRENCH GUIANA

American crocodile
Boa constrictor
Common caiman
Emerald tree boa
False coral snake
Green anaconda
Indigo snake
Matamata
Milksnake
White-bellied wormlizard

GABON

Black-necked spitting cobra
Boomslang
Helmeted turtle
Nile crocodile

GAMBIA

Black-necked spitting cobra
Helmeted turtle
Nile crocodile

GERMANY

Sand lizard

GHANA

Boomslang
Helmeted turtle
Nile crocodile

GREECE

Common chameleon

GUATEMALA

American crocodile
Boa constrictor

Central American river turtle
Common caiman
Indigo snake
Knob-scaled lizard
Milksnake
Neotropical sunbeam snake
Snapping turtle

GUINEA

Black-necked spitting cobra
Boomslang
Helmeted turtle
Nile crocodile

GUINEA-BISSAU

Black-necked spitting cobra
Boomslang
Helmeted turtle
Nile crocodile

GUYANA

American crocodile
Boa constrictor
Common caiman
Emerald tree boa
False coral snake
Green anaconda
Indigo snake
Matamata
Milksnake
White-bellied wormlizard

HAITI

American crocodile
Milksnake
White-bellied wormlizard

HONDURAS

American crocodile
Boa constrictor
Common caiman
Indigo snake
Milksnake

Neotropical sunbeam snake
Snapping turtle

HUNGARY

Sand lizard

INDIA

Gharial
House gecko
King cobra
Little file snake
Nilgiri burrowing snake

INDIAN OCEAN

Green seaturtle
Leatherback seaturtle
Loggerhead turtle
Sea krait

INDONESIA

Blind lizard
Common sunbeam snake
Flying lizard
House gecko
King cobra
Komodo dragon
Little file snake
Red-tailed pipesnake
Reticulated python

IRAQ

Sandfish

ISRAEL

Common chameleon
Horned viper
Sandfish

IVORY COAST

Boomslang
Helmeted turtle
Nile crocodile

JAMAICA

American crocodile
Milksnake

JORDAN

Common chameleon
Horned viper
Sandfish

KENYA

Black-necked spitting cobra
Boomslang
Helmeted turtle
Jackson's chameleon
Nile crocodile

LAOS

Big-headed turtle
Common sunbeam snake
House gecko
King cobra
Red-tailed pipesnake
Reticulated python

LATVIA

Sand lizard

LEBANON

Common chameleon
Sandfish

LESOTHO

Boomslang
Helmeted turtle

LIBERIA

Boomslang
Helmeted turtle
Nile crocodile

LIBYA

Common chameleon
Horned viper
Sandfish

LITHUANIA

Sand lizard

LUXEMBOURG

Sand lizard

MACEDONIA

Sand lizard

MADAGASCAR

Armored chameleon
Helmeted turtle
House gecko
Nile crocodile

MALAWI

Boomslang
Helmeted turtle
Nile crocodile

MALAYSIA

Blind lizard
Common sunbeam snake
False blind snake
House gecko
King cobra
Little file snake
Red-tailed pipesnake
Reticulated python

MALI

Boomslang
Nile crocodile
Sandfish

MALTA

Common chameleon

MAURITANIA

Horned viper
Sandfish

MAURITIUS

Splitjaw snake

MEXICO

American crocodile
Boa constrictor
Cape spinytail iguana
Central American river turtle
Common caiman
Common chuckwalla
Desert night lizard
Desert tortoise
Eastern box turtle
Gila monster
Green anole
House gecko
Indigo snake
Knob-scaled lizard
Milksnake
Neotropical sunbeam snake
North American coral snake
Six-lined racerunner
Snapping turtle
Spiny softshell
Texas alligator lizard
Texas blind snake
Two-legged wormlizard
Western banded gecko

MOLDOVA

Sand lizard

MOROCCO

Common chameleon
Horned viper

MOZAMBIQUE

Boomslang
Helmeted turtle
Nile crocodile
Southern burrowing asp

MYANMAR

Big-headed turtle
Common sunbeam snake

House gecko
King cobra
Little file snake
Red-tailed pipesnake
Reticulated python

NAMIBIA

Black-necked spitting cobra
Boomslang
Helmeted turtle
Southern burrowing asp
Spiny agama

NEPAL

Gharial
King cobra

NETHERLANDS

Sand lizard

NEW ZEALAND

Tuatara

NICARAGUA

American crocodile
Boa constrictor
Common caiman
Indigo snake
Milksnake
Neotropical sunbeam snake
Snapping turtle
Southern bromeliad
woodsnake

NIGER

Black-necked spitting cobra
Boomslang
Sandfish

NIGERIA

Black-necked spitting cobra
Boomslang
Helmeted turtle
Nile crocodile

PACIFIC OCEAN

Green seaturtle
Leatherback seaturtle
Loggerhead turtle
Sea krait

PAKISTAN

Gharial

PANAMA

American crocodile
Black-headed bushmaster
Boa constrictor
Common caiman
Indigo snake
Snapping turtle
Southern bromeliad
woodsnake

PAPUA NEW GUINEA

Blind lizard
Crocodile monitor
Frimled lizard
Green python
House gecko
Little file snake
Pig-nose turtle

PARAGUAY

Bachia bresslaui
Boa constrictor
Early blind snake
White-bellied wormlizard

PERU

Boa constrictor
Common caiman
False coral snake
South American river turtle

PHILIPPINES

Blind lizard
House gecko
Little file snake
Reticulated python

POLAND

Sand lizard

REPUBLIC OF THE CONGO

Black-necked spitting cobra
Boomslang
Helmeted turtle
Nile crocodile

ROMANIA

Sand lizard

RUSSIA

Sand lizard

RWANDA

Black-necked spitting cobra
Boomslang
Helmeted turtle
Nile crocodile

SAMOA

House gecko

SÃO TOMÉ AND PRÍNCIPE

Helmeted turtle
Nile crocodile

SENEGAL

Black-necked spitting cobra
Helmeted turtle
Nile crocodile
Sandfish

SERBIA AND MONTENEGRO

Sand lizard

SIERRA LEONE

Boomslang
Helmeted turtle
Nile crocodile

SINGAPORE

Common sunbeam snake
False blind snake
House gecko
King cobra
Little file snake
Red-tailed pipesnake
Reticulated python

SLOVAKIA

Sand lizard

SLOVENIA

Sand lizard

SOLOMON ISLANDS

House gecko
Prehensile-tailed skink

SOMALIA

Agamodon anguliceps
Boomslang
Helmeted turtle

SOUTH AFRICA

Black-necked spitting cobra
Boomslang
Cape flat lizard
Helmeted turtle
Southern burrowing asp
Spiny agama

SPAIN

Common chameleon

SRI LANKA

House gecko
Little file snake

SUDAN

Black-necked spitting cobra
Boomslang

Helmeted turtle
Horned viper
Nile crocodile

SURINAME

American crocodile
Boa constrictor
Common caiman
Emerald tree boa
False coral snake
Green anaconda
Indigo snake
Matamata
Milksnake
White-bellied wormlizard

SWAZILAND

Boomslang
Helmeted turtle
Southern burrowing asp

SWEDEN

Sand lizard

SYRIA

Common chameleon
Horned viper
Sandfish

TAIWAN

Yellow-margined box turtle

TANZANIA

Black-necked spitting cobra
Boomslang
Helmeted turtle
Jackson's chameleon
Nile crocodile
Southern burrowing asp

THAILAND

Big-headed turtle

Blind lizard
Common sunbeam snake
House gecko
King cobra
Little file snake
Red-tailed pipesnake
Reticulated python

TIMOR-LESTE

House gecko
Little file snake
Red-tailed pipesnake

TOGO

Boomslang
Helmeted turtle
Nile crocodile

TUNISIA

Common chameleon
Horned viper

TURKEY

Common chameleon

TUVALU

House gecko

UGANDA

Black-necked spitting cobra
Boomslang
Helmeted turtle
Nile crocodile

UKRAINE

Sand lizard

UNITED KINGDOM

Sand lizard

UNITED STATES

American alligator
Broad-headed skink
Common chuckwalla
Common garter snake
Cottonmouth
Desert night lizard
Desert tortoise
Eastern box turtle
Eastern hog-nosed snake
Florida wormlizard
Gila monster
Green anole
House gecko
Indigo snake
Milksnake
North American coral snake
Painted turtle
Six-lined racerunner
Snapping turtle
Spiny softshell
Stinkpot
Texas alligator lizard
Texas blind snake
Timber rattlesnake
Western banded gecko

URUGUAY

Boa constrictor
White-bellied wormlizard

VANUATU

House gecko

VENEZUELA

American crocodile

Boa constrictor
Common caiman
Crocodile tegu
Emerald tree boa
False coral snake
Green anaconda
Indigo snake
Matamata
Milksnake
South American river turtle
White-bellied wormlizard

VIETNAM

Blind lizard
Common sunbeam snake
House gecko
King cobra
Little file snake
Red-tailed pipesnake
Reticulated python

YEMEN

Common chameleon
Helmeted turtle
Horned viper

ZAMBIA

Boomslang
Helmeted turtle
Nile crocodile
Southern burrowing asp

ZIMBABWE

Boomslang
Helmeted turtle
Nile crocodile
Southern burrowing asp